SCIENCE AND INDUSTRY

LOS ANGELES PUBLIC LIBRARY

25¢

Organic Gardening

Better Gardening without Chemicals

STACKS

THE MAGAZINE FOR DISCRIMINATING GARDENERS

Gardening is FUN... with ROTO-HOE

GARDEN TOOLS

ROTO-HOE Attachments give Year Round Usefulness at Small Cost

12", 16" and 20" Roto-Cutters. Rotary lawn mowing at its best. Attachments only $24. to $40. depending upon size

16" Roto-Sno Blower. Rotary type, blows snow to either side, clears 16" swath, saves 75% of work. Attachment only $38. extra.

New Safe-Speed Edger. Quick and easy edging of sidewalks, driveways, flower beds. Will till small gardens and plots. $39.50 for this attachment.

Adapta-Tool Cart. Sturdy steel platform with 2 rubber tire wheels for mounting pump, sprayer, generator, other tools —gives complete easy portability. Costs only $14.50 to add to basic unit (less tools, of course).

2 H.P. Roto-Hoe only $134.00

YOU can really ENJOY your gardening efforts with this versatile, efficient tool. Many home gardeners are finding that they get real relaxation and enjoyment after a hard and tiring day at their regular jobs —by gardening with their ROTO-HOE and its attachments.

more machine for your money

LOOK WHAT YOU GET FOR ONLY $251

Roto-Hoe, Complete	$134.00
Roto Cutter Attachment	40.00
Roto-Zephyr Sprayer Attachment	77.00
	$251.00

You can get any of these separately, and add others as you desire.

You can afford ROTO-HOE without straining your family budget. Tremendous consumer demand has enabled us to maintain the low, low 1947 price of only $134. for complete basic ROTO-HOE unit shown. Attachments are equally low-priced. Hundreds of dealers in U. S. and Canada glad to serve you.

GET THE FACTS—*You'll be glad you did!*

You will find, as have thousands of other gardeners in U. S. and Canada, that ROTO-HOE offers many features you want—at remarkably reasonable prices. Buy the basic unit (or any combination) now, add attachments as desired later. Your ROTO-HOE dealer will gladly demonstrate for you. See him today. Or write us for free color folder and nearest dealer's name.

ROTO-HOE & SPRAYER CO.
Box 2, Newbury, Ohio

Yes, I want the facts about ROTO-HOE and attachments—how it can give me more of the FUN in Gardening. Send your free color folder at once, and tell me name of nearby dealer where I can see ROTO-HOE.

Name .....

St. or R.D. .....

City ..... Zone ..... State .....

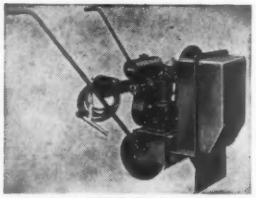
GOOD HEALTH REQUIRES RELAXATION

In the rush of modern living more and more people are learning that their doctors are right—it is important to one's health to have active physical participation in some good hobby. And plenty of folks feel that gardening is one of the best hobbies—but it can be hard work without the use of proper tools. So let ROTO-HOE do the hard work for you—you get the healthful relaxation without the tiresome difficult work.

ROTO-HOE IS EASY TO OPERATE

Powerful Lauson 2 h.p. gasoline motor rotates 15 specially hardened teeth at high speed, thoroughly loosening, cultivating and aerating soil to 6" depth—pulling ROTO-HOE forward. You simply guide it, lift rotors out of ground whenever desired by light pressure on handles. Hard work is eliminated.

OUR NEWEST ATTACHMENT



ROTO-ZEPHYR SPRAYER

Now we offer for the first time the new Roto-Zephyr Sprayer—for spraying trees and plants around home and garden. The Bonderized and enameled 5-gallon tank attaches to the standard ROTO-HOE power unit in minutes; you can easily wheel sprayer wherever wanted. Piston type bronze pump has screen and relief valve, operates from ROTO-HOE's powerful Lauson motor. Spray gun is modern in design, light weight and foolproof. This complete ROTO-ZEPHYR Sprayer attachment costs only $77. to add to basic unit —or may be purchased separately. See your ROTO-HOE dealer.

FILL IN AND MAIL THIS COUPON NOW!

ROTO-HOE & SPRAYER COMPANY

Box 2 — Newbury, Ohio

A Truly Wonderful New Idea To Help Give Your Dog or Cat More Pep, Bounce and Energy

Q-S

NATURAL PET FOOD SUPPLEMENT

(A Multi-Vitamin, Organic Mineral Natural Concentrate)

The best thing you can give your dog or cat is GOOD HEALTH! Like human beings, to feel alive, spirited, have a happy disposition and enjoy life; they too—MUST EAT RIGHT!

Animals need a balanced diet of natural unrefined and uncooked foods. Q-S is the first and only all-natural, uncooked scientific food supplement for pets. It is engineered for COMPLETENESS—and completeness means economy. Q-S (Quantum Sufficit) if added to your pet's food for one month, will demonstrate it's values.

Q-S CONTAINS CONCENTRATES that are processed in the absence of high temperatures from RAW beef kidney, liver, brain, bone marrow; beef kidney, liver, glandular and fish liver lipoids (fats); alfalfa, beet leaf, beet molasses, lettuce, carrot, rose hips, biologically processed cereal, fish meal, cereal germ, keratin, yeast, rice polish, mushrooms (organically grown) and kelp. Low temperature sterilized sea water solids included from processing. All of these valuable food concentrates are carried in a mixture containing substantial amounts of viable lactic yeast. UNCOOKED fish and vacuum dried veal bone flour (including fat and made from U. S. Inspected veal ribs and spine), brewer's yeast, rice polish, oat flour and wheat germ. So—*For Pet's Sake—buy it and try it.* Literature on request....

1 Month Supply for 30 lb. animal.....$2.85

(If your dealer doesn't stock Q-S — Drop us a card with his address)

Or Direct Postpaid from:

QUE-ESS LABORATORIES INC.

LABORATORY: (Dept. G-8)
6164 SEPULVEDA BOULEVARD
VAN NUYS, CALIFORNIA

EXECUTIVE OFFICES: (Dept. G-8)
ONE WASHINGTON STREET ARCADE
ORLANDO, FLORIDA

Vol. 21, No. 8 August, 1953

Organic Gardening

editorial

Are We Using Too Much Compost? (Part VI)
J. I. Rodale 10

features

Remarkable News About Your Teeth 14

Only the Soil Can Feed Plants
Thomas Powell 17

Ornamental Grasses
L. Pillars 21

More Than Trees Die 24

Garden Magic with Surface Compost
Paula Seidel 30

Do Your Own Rose Budding
Ralph Oldham 37

Fluorescent Lighting of African Violets
Robert L. Rasmussen 44

Maybe You Wouldn't Believe It... How Much? 47

The Decision Must Be Ours 57

departments

The Forum 4

Course in Organics—Lesson VII—Carbon
J. I. Rodale 25

The Organic World 40

Garden Calendar 48

Questions and Answers 54

STANDARD WORKS IN ORGANICULTURE

An Agricultural Testament by Sir Albert Howard. The basic work which established the principles underlying the organic method. 253 pp. $3.50

Pay Dirt by J. I. Rodale. Contains specific information necessary to be a good organiculturist. For the backyard gardener as well as the large-scale farmer. 252 pp. $3.50

The Healthy Hunzas by J. I. Rodale. A book about the inhabitants of a section of India who are astoundingly healthy because of the way they raise their food. Illustrated, 263 pp. $3.00

The Organic Front by J. I. Rodale. Miscellaneous writings on organiculture and its implications which, because of their extreme importance, should not be neglected. 200 pp. $2.50

The Earth's Green Carpet by Louise E. Howard. Lady Howard shows that the study of life's cycle as a whole leads inevitably to a reformed agriculture for the health of the community. 260 pp. $3.00

Farmers of 40 Centuries by F. H. King. Shows dozens of ways used by the Chinese to make compost. 384 pp. $5.00

Earthworms—Their Intensive Propagation by Thomas J. Barrett. Tells how to propagate earthworms. Paper, 60 pp. $1.00

Food, Farming, and the Future by Friend Sykes. Completes the theme of HUMUS AND THE FARMER and shows the way to a more efficient agriculture. Illustrated, 294 pp. $4.50

Humus and the Farmer by Friend Sykes. The biography of a thousand-acre English farm. Illustrated, 416 pp. $4.50

Farming and Gardening in the Bible by Alastair I. MacKay. In hundreds of beautifully retold anecdotes and quoted passages from the Scriptures. Fascinatingly recreates the rural background of ancient Hebrew life. 280 pp. $3.00

The Lorette System of Pruning by Louis Lorette. Lorette pruning aims at the formation of fruit buds directly upon the main branches forming the framework of the tree. 130 photos and diagrams, 239 pp. $3.00

Stone Mulching in the Garden by J. I. Rodale. An authoritative guide to the use of stones and rocks for obtaining greater yields and healthier plants. Illustrated, 164 pp. $3.00

When ordering any of the above titles, please make check or money order payable to

THE RODALE PRESS
Book Dept. Emmaus, Pa.

J. I. Rodale, Editor-Publisher; Robert Rodale, Executive Editor; M. C. Goldman, Managing Editor; Karl Manahan, Laszlo Matulay, Art Directors; Anne A. Rodale, Flower Arrangements; John J. Larmer, Advertising Director; Theodore Handelman, Circulation Manager.

Published monthly by RODALE PRESS. Publication, Executive, Editorial and Subscription Offices: 6th and Minor Streets, Emmaus, Pa. Advertising Offices: 46 S. West St., Allentown, Pa. Subscription Rates: United States and Possessions, One Year $3.00, Three Years $7.00, Five Years $10.50. When changing an address, give the old address as well as the new. When writing concerning your subscription, please include the code line which appears directly above your name. It will assist us in locating your subscription and insure speedy and accurate service. Allow five weeks for change of address. Printed in the United States of America. Copyrighted 1953 by RODALE PRESS. Entered as second class matter January 27, 1948, at the Post Office at Emmaus, Pa., under the act of March 3, 1879.

No Other Power Equipment Does So MANY Jobs So Easily and So Well!

M-E ROTARY TILLERS do a wonderful soil-working, soil-building job! Gardeners and growers everywhere—truck farmers, florists, nurserymen, fruit growers, many others — acclaim it the finest equipment they've ever used!

ROTARY TILLER

NOW YOU CAN DO your hardest job in one operation . . . Do many jobs with one machine! Prepare a perfect seedbed quickly and easily . . . improve the soil at the very same time! Cultivate, weed, and compost, too, without adding attachments or changing tines!

M-E NOT ONLY SAVES TIME AND LABOR IN WORKING SOIL — it also can save you hours and dollars in dozens of ways with fifteen "plug-in" attachments for year 'round jobs!

AND REMEMBER THIS: M-E Rotary Tillers are properly powered, precision-built, scientifically developed . . . the ONLY rotary tiller with variable wheel and rotor speeds for controlled soil aggregation . . . the only one with universal, non-winding, self-sharpening tines — guaranteed against breakage. See your M-E dealer for a demonstration soon!

Small in Size and Price –But MAN!

What a Job it Does!

Greatest little power tool ever made for home gardeners! Tills, cultivates, weeds, mulches — easy to handle in small plots, corners, close to shrubs. 2½ HP engine, big 16 in., or 20 in. swaths, M-E's famous universal non-winding tines (guaranteed against breakage). Attachments available soon. See your M-E Dealer for demonstration and full details today!

FREE BOOKLET! Fully illustrated, tells story of Rotary Tillage, shows complete M-E line. Ask your M-E Dealer or write M-E, 311 Marion St., South Milwaukee, Wis.

Gardening for Pleasure or Profit

REBUILDS SOIL NATURE'S WAY

MILWAUKEE ROTARY TILLERS

Milwaukee Equipment Mfg. Co., So. Milwaukee, Wis.

Subsidiary Food Machinery & Chemical Corp.

dahlias delight

We have just seen copies of your May issue of *Organic Gardening* and wish to express our appreciation for the use of the article entitled "Design for Dahlia's" by A. C. Ronning, who is one of our outstanding members. Your interest in placing articles of this nature in your publication is very gratifying and it is, of course, a source of pleasure to see our own members being recognized in this manner.

T. Z. Ennis, President
Minnesota Dahlia Society
Minneapolis, Minnesota

beet-pulp for mulching

Never thought of it before. How about beet-pulp for garden mulch? First, rock phosphate and a little hen manure. Beet-pulp mixed with sawdust would form a good acid to loosen the rock, and the calcium in the rock would control the acid perfectly. Beet-pulp is bulky, would rot easily. Yes, I'll try it; thought it might interest others, too.

H. F. Scott
Domville, Ontario, Canada

THE COVER

"A Living Bouquet" is extended in the delicately artistic fashion of Marvin Bileck, talented designer of several previous Organic Gardening covers. Typifying the season's return of colorful bounty, this skilfully appealing garden glance reflects Bileck's deft line drawing and exquisite adaption of oriental draftsmanship techniques to modern art.

good gardening, rich rewards

We have read *Organic Gardening* practically from it's start, but it wasn't until last year that we had the opportunity of reaping some of the rewards in our own garden. We could tell you so many wonderful things. For instance, our Sweet Meat squash were something to behold. The seed catalog stated the size as from 8 to 10 pounds. Most all of ours weighed from 35 to 43 pounds each, and one vine produced over 340 pounds of sweet, high quality, long keeping squash. We may have fresh squash until the new summer crop.

Our melons were the best we had ever eaten. One man, a visitor from Pittsburgh, Pa., after purchasing a couple of our Crenshaws came back and begged us to let him have two more to take back home to Pittsburgh to his folks to show them his find and what real organic melons were like. He took them by plane and I hope they arrived safely. I asked him if they didn't grow good melons back there and he said, "Well, I always thought we did, but I've never tasted anything like these before." Apparently he had been acquainted only with commercially grown market melons.

I could go on and on telling you of our experiences, such as our County Farm Advisor's reactions to our garden soy beans. When they were a little over half grown I pulled up one vine and took it to town to inquire of him what if anything might be wrong with the roots, which proved to be no more than a beginner's worries about nothing. But the point is, he first asked me what kind of plants they were and he just couldn't believe this specimen was a soy bean. He said, "Soy beans are not supposed to grow that large, and if anything is wrong with the roots, such a strong plant will overcome it anyway." But, he said, "The important question is, will you get any beans from them?" They seem

too rank of growth to produce beans." He added that commercial growers have not been able to produce worthwhile crops of soy beans in the Sacramento Valley for some reason, and for me not to be disappointed.

When these soy beans were through growing they were over my head, topping six feet and the crop seemed to be endless. We ate all we could fresh, canned enough for a couple of seasons, and then called in the neighbors to pick all they wanted, and still rototilled under probably a third of the crop. Three cheers for Organics!

Paul B. Goodier
Carmichael, California

green manure method

One reads so much about green manure, perhaps my method may interest your readers:

During the month of September I broadcast rye seed between the dahlias and gladiolus in the rows and harrow it in. I don't spare the seed, but broadcast it thickly. You can walk all over the seed without doing any harm. When the frost burns my plants, I plow a furrow between rows and lay what is left of leaves in this furrow. I do the same with canna leaves. By this time the rye is about eight inches tall and tender. I then plow everything under and let it lie over the winter.

In the spring I broadcast old chicken manure and cut harrow. With this method I have found the rye and leaves rotted and ready to improve my soil. I then broadcast bone meal and harrow that in and my ground is in first class condition.

The method many farmers here employ is to wait until spring when the rye is about two feet tall and tough before harrowing and they do not get results until the latter part of June. I plow eight inches deep bringing back what had leached through during the summer. After eight years of this

GROW THE
GIANT LILY
OF THE HIMALAYAS UP TO
10 FEET TALL
(Lilium giganteum)

Picture these giant lilies in your garden. Be the first in your community to grow lilies up to 10 feet tall. Beautiful white, fragrant, trumpet blooms —the most sensational lily grown. Unbelievable. Hardy. Bulbs in 3 sizes —$1.50, $2.50, 3.50 postpaid.

ORCHID LILY
(Speciosum magnificum)

The most beautiful of the rubrums. Rich carmine, margined with white. Large flowers, long-lasting cut flowers, excellent for corsages. Extra large bulbs 9 to 10"—$1.50 ea. 6 for $7.50.

We are growers of quality lilies. Bulbs are usually dug the day shipped. Write for informative list describing 100 varieties—old favorites and the newest hybrids. Order now —early October delivery.

LILYDALE
16530 S.E. Webster Road, Milwaukee 22, Oregon

GRIND YOUR OWN
WHOLE GRAIN FLOUR

and you will know that it contains no agene or other preservative or chemical. The flavor alone will tell you how much better it is.

A postcard will bring full particulars.

LEE ENGINEERING COMPANY
Milwaukee 3, Wisconsin

RAINBOW
100 TULIPS $3.39 POSTPAID IN U.S.
BLOOMING SIZE BULBS

Unusual assortment of gorgeous colors. Every bulb 3½" to 4" circumference—as large around as a Half Dollar—*not the small "bargain" grade.* Order NOW—we'll ship at best time for fall planting. *No C.O.D.'s, please.* NEW FALL CATALOG offers choicest varieties of Tulips, Narcissus, Dwarf Fruit Trees, Shrubs, Roses, Evergreens, Fruits and Perennials. *Lowest Prices.* It's FREE — Write today.
THE WHITTEN NURSERIES, Box 405, Bridgman, Mich.

Better Than Fertilizer!

Activ0 makes rich, activated compost-fertilizer quicker, better, easier, cheaper, from waste, leaves, garbage, etc. . . . (reduces garbage without odor!) . . . Activates, conditions, and sweetens soils . . . many other uses. Organic. Bacterial. Odorless. Trial size for 425-lb. compost, No. 71-1025, $1.00. 1400 lb. size, No. 71-1030, $2.59.

SEARS, ROEBUCK & CO. Catalogs; Stores

DAYLILIES
AMERICA'S LARGEST
GROWER (30 Acres)
FREE LIST illustrated in color. Better varieties — Lower prices.
Russell Gardens
Spring 10, Texas

SAVE 30% ON ROTARY TRACTORS

Save 30% by buying direct factory-to-you Tough, rugged 3 H.P. motor Reverse & full differential for easy handling. Automatic clutch Power take-off Lowest priced tractor in the field Words of praise from 48 states.
Absolute factory guarantee Act now Write for information
SEND FOR FREE Booklet
CULTILLER Manufacturing Co.
Dept. G NEW BRUNSWICK, N. J.

work I have a soil that will grow anything from what was once a lot of sandy soil. Furthermore it is insect-proof.

G. Ernest Widmann
Fort Pierce, Florida

glads for color combination

A plot of "glads" is veritably a continuous display from mid-July until heavy frosts. Just when the summer's heat has shriveled the corn flowers into dried remains, the tulip parade has long since disbanded among their yellowed vestige of leaves; the Canterbury bells have faded to brown, parch-like cups, and the poppies have shed their brief glory. Then 'tis that "glads" are the glow of the season.

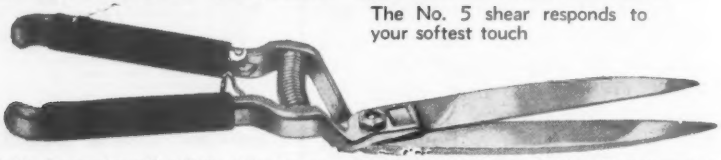
No other flower offers such an interesting variety of colors and contrasting tones for arrangements. I like arrangements composed of but one or two colors instead of a medley of reds, yellows, pinks, blues, etc., all striving for supremacy.

My favorite combinations are Miss Bloomington, a clear yellow, and Elizabeth the Queen, a beautiful ruffled orchid penciled with deeper veinings. The huge spikes of either Rosa van Lima, an exquisite pink, or the soft glow of Shirley Temple produces an enchanting effect with the glistening white of Margaret Beaton. Midnight Red, King Alfred, or Vagabond Prince, all massive spikes of intense reds, are very striking with the creamy loveliness of Maid of Orleans.

Roman Gold, a soft orange mellowing into a yellow throat, is lovely with either some yellow or complemented with blue or purple. The arrangements are endless, but these are just a few of my favorites.

TRIM YOUR GRASS QUICKER-EASIER

The No. 5 shear responds to your softest touch



Light-touch No. 5 operates with a flick of the fingers. Bulge design lets you cut easily with left or right hand. Neoprene rubber stops prevent sting or jar. Length: 12". Order yours today . . . $2.95*

HEDGEMASTER

Trim hedges quicker, with less exertion with HEDGEMASTER. Both blades move . . . you get continuous cutting action that trims in a breeze. Cutting head may be locked in either of two positions. Balanced design eliminates tiring vibration. Get yours now!

Only $39.95.

Mighty Midget Vine Pruner

Perfect tool for today's vine pruning tasks. Seasoned hickory, bolted handles. 19¼" long, 20 oz. **$5.25***

FREE CATALOG

featuring dozens of electrical appliances for home and garden . . . yours FREE.

ORGANIC PRODUCTS

No. 8 Hand Pruner For Light Pruning

Preferred by many because of its smaller size. Forged alloy handles are covered by Neoprene bumpers for comfort. High-carbon steel replaceable blades. GUARANTEED against defects. Yours for only $3.95*

ANVIL TYPE HAND PRUNING SHEAR

America's first anvil type pruning shear . . . operates with one hand. Pistol grip shape fits hand. Small cutting head lets you get into hard to reach spots. Chrome plate on steel . . . $2.95*

ORGANIC PRODUCTS
Dept. G-853, 2432 Route 22, Union, N. J.
Enclosed is check or money order for items checked below:

..... No. 5 Grass Shears ..... $ 2.95
..... Hedgemaster 39.95
..... Mighty Midget Vine Pruner 5.25
..... No. 8 Hand Pruner 3.95
..... Anvil type pruning Shears 2.95
..... Free Catalog on electrical appliances for home and garden. (Add 10% W. of Miss.)

Name .....

Street .....

City ..... Zone ..... State .....

Dept. G-853, 2432 Route 22, Union, New Jersey
*add 10% west of Mississippi

I find that the mistlike beauty of asparagus greatly enhances "glad" cuttings as the fine greenery gives the spikes verdure. Leaves of cattail, iris, lily, etc., make excellent "fillers" for bouquets to supplement their own swordlike blades.

Miss Irma Lovely
Rt. 4, Augusta, Maine

mulching combats insects

Last year I was setting out watermelon plants and was driven in by rain before I could finish. I had all but one hill mulched with compost. I didn't get back for two days and the unmulched hill was literally destroyed by striped cucumber beetles, the others were not bothered. I had this experience with other things I have mulched; they appear to be less susceptible to pests.

It appears that bare ground invites pests. Would it not be possible that the mulch on the ground in its process of being converted into soil and plant food gives off a gas which is a bane to pests?

This year I planted peas and onion sets in March and only got about half of each mulched with chicken house litter and a long rainy spell set in. It is remarkable the difference noticeable in the part mulched and that not mulched; it is richer in color and the plants are heavier.

There are certainly many interesting things in this business of gardening.

E. M. Watson
Chardon, Ohio

The gas you refer to is carbon dioxide, which is released as the organic matter decomposes, and does discourage pest infestation on healthy soil.—Ed.

Every Bloom Bright Red!

Giant RED AFRICAN VIOLET

- Clusters of Red Flowers
- Trailing Stems and Leaves

Special-by-Mail **$1** ea. (3 for $2)

The most magnificent Violet (Episcia coccinea) we've seen. Produces real red blooms. Lovely velvety copper and green leaves that grow long and trailing like an ivy vine. Easy to grow and blooms without special care or trouble. We send a healthy blooming size plant already covered with leaves. Grow either in pots or from wall planter. Limited Supply. SEND NO MONEY. On delivery pay cost and C.O.D. postage. We pay postage on prepaid orders. If not delighted return at once for your money back.

KRUSE NURSERIES,
Dept. 65404, Bloomington, Ill.

Print Name .....

Address .....

CANADIAN HEMLOCK

Make a

Beautiful Evergreen Hedge

12-18 in., $18. per 100 18-24 in., $30. per 100
$125. per 1000 $225. per 1000

Express Prepaid on Fall Orders Placed Now.

BOB'S EVERGREEN SALE

P.O. Box 948 Elizabethton, Tenn.

COMPOST
50c A TON

Easily Made From Waste Material

Burkleigh Compost Activator is entirely natural; organic. Makes sweet, earthy compost from leaves, grass clippings, garden waste, hay, straw, sawdust, manures if available. A little does much. Keeps full strength until used. Send only $1. for enough to activate up to two tons, plus complete instructions including "Secrets of Sawdust" and special 32-page booklet "Gardening in God's Way."

BURKLEIGH COMPANY

Dept. 199, Towson, Maryland

ROOT YOUR OWN CUTTINGS IN SAND

in a box, greenhouse, or Hotbed. Scientific instructions copyrighted, $1.00. It is easy in an amazingly short time to root cuttings of Camellias, Azaleas, Gardenias, Roses, Evergreens, and other plants in sand, any time of the year, with our instructions. This information costs us thousands of dollars, and years of experience and costs you only $1.00. Postpaid.

NATIONAL NURSERIES, Dept. 22, Biloxi, Miss.

Free Catalog on Camellias, Azaleas, Gardenias

"The GARDENER"

supplement of The FARMER
TWO MAGAZINES in ONE

The current number includes articles on *Russian Comfrey for Compost; Organic Tomato growing; Using diseased material;* Quarterly; Illustrated; $1.50 only for one year. From

FERNE FARM

Shaftesbury, Dorset, England

JAPONEX

(Milky Disease Spore Powder)

Natural, organically-approved, biological control for

JAPANESE BEETLE GRUBS

Inoculation of soil with milky disease spore powder is positive control . . . effective for years. Simple, safe lawn treatment stops beetles in grub stage of growth . . . kills them BEFORE they can begin damaging raids on your garden.

1 lb. treats 4,000 sq. ft. of lawn
½ lb. JAPONEX $3.00 1 lb. $5.50

See your dealer or write:

FAIRFAX BIOLOGICAL LABORATORY

Dept. G-8 Clinton Corners, New York

welcome...

to new Organic Gardening Clubs

Joining the many active and popular Organic Gardening Clubs, which now number close to 100 organizations throughout the U. S. and Canada, are several newly formed Clubs. We are happy to extend a cordial welcome and to wish them every success in their gardening and group work:

San Gabriel Valley Organic Gardening Club
Ralph E. Salley
5528 North Burton Avenue
San Gabriel, California

Westchester Organic Gardening Club
Seymour Lieberman
114 Windermere Drive
Yonkers, N. Y.

Alliance Organic Farmers & Gardeners Club
L. E. Bacon
2207 S. Arch St.
Alliance, Ohio

Organic Gardening Club of Lake County
Mrs. Charles Walker
752 E. 340
Willoughby, Ohio

Ohio Pike Organic Gardening Club
Wilbur F. Butts
R. No. 2, Box 42F
Amelia, Ohio

Organic Soilbuilders Club of Litchfield County
Mrs. W. F. Hadley
Bridgewater, Conn.

East Portage Organic Garden Club
Mrs. Dick Lemcke, Chairman
Hecla, South Dakota

Organic Gardening Club of South Florida
Mrs. R. L. Underwood, Secy.
740 N.E. 87th St.
Miami 38, Florida

Evergreen Organic Gardening Club of Seattle
F. W. Goodale
9908 E. Marginal Way
Seattle 8, Washington

Goldendale Organic Gardening Club
Miss Lillian Imrie
Box 421
Goldendale, Wash.

Arapahoe Organic Gardening Club
Mrs. Mary Rybicki, Secy.
4050 South Pearl St.
Englewood, Colorado

the organic country store

The Organic Country Store at the Rodale Experimental Farm is open through the summer months. Come in and browse around, 10 A. M. to 4 P. M., any day of the week, including Sunday. It is located just west of Allentown, Penna., off Route 222 toward Emmaus—map available on request.

The Country Store shelves are stocked with fertilizers, mentioned in our magazines: seaweed and dehydrated animal manures, phosphate, and potash rock (granite dust), peat moss and mulching materials, to list a few. There are food shredders, too, to save the vitamins in your garden vegetables; activators to speed the breakdown of the compost pile. Almost everything, in fact, for organic gardening needs, including booklets on all phases of organic gardening. We are sorry—no mail orders.

And while you are with us, take a tour of the farm. There is lots to see.

"It's just a little organic matter—very good for growing things."

NEW **LILY** CATALOG

OUR 1953-54 PROFUSELY ILLUSTRATED LILY CATALOG FEATURING FINEST NEW STRAINS OF HARDY HYBRID LILIES AS WELL AS MOST OF THE BEST SPECIES ADAPTED TO GARDENS EVERYWHERE IS NOW AVAILABLE.

Send 10c in coin or stamps for your copy today. If you are considering the lilies you won't want to miss this valuable lily booklet.

Walter Marx Gardens

Box 38-OG **Boring, Oregon**

AMAZING MULTIFLORA ROSE AS LOW AS

LIVING FENCES 5¢ Per Ft.

BEAUTIFY YOUR HOME with dense rose hedges. At low cost—as little as 5c a foot. WRITE TODAY for FREE CATALOG.

HARDY PHLOX 5 FOR $1 Postpaid in U. S.

Ready to bloom next summer. Five different colors—Flowers from July through September. Write for Free Catalog today!
THE WHITTEN NURSERIES, Box 406, Bridgman, Mich.

Do You Want a Genuine
SOIL CONDITIONER?

Try ActivO. Besides the true acrylic and resin compounds which Nature uses, ActivO adds the dynamic life and energy that make soils productive, fight disease, grow healthier plants, prettier flowers and more healthful, better flavored fruits and vegetables. Money-back guarantee. Real economy trial size, $5.95 postpaid.
L. L. OLDS SEED CO. **Madison, Wisc.**

BLUE CAMAS LILY

Great blossom-stars in tall informal spikes for many Spring weeks. It is Camassia quamash, delightfully different, but easy as Tulip, and hardy.

16 for $1.00 **100 for $5.00**

Illustrated Bulb Catalog on request

PEARCE SEED CO., Dept. D. Moorestown, N. J.

"GROW EXTRA DOLLARS—AT HOME"
by Ray Reynolds

You know how to grow house plants. Make it a sideline business. This book shows exactly how.
The author has built a profitable business at home, while commuting to his city job. He tells home gardeners the equipment needed, what to grow, how to price, where and how to sell.

A concise working manual . . . 52 pages . . . $2. postpaid

REYNOLDS GARDENS
Box OG, Armonk, N.Y.

WITH THE EDITOR

are we using too much compost?

Part VI *Readers' Letters*

J. I. RODALE

It may add a little interest in this series if I reproduce here a few letters received from readers commenting on the articles. The first one is from H. H. Watson of Phil Campbell, Alabama, who wrote:

"I believe that it was in a recent issue of *Organic Gardening* that you said you had decided that the large quantity of organic matter used in your orchard soil seemed to be having an undesirable effect on the trees, which you believed was due to too much nitrogen from the organic substances you had been working into the orchard soil.

"Perhaps, in this connection, you would like to know what one noted Missouri nursery company has to say about over-fertilizing fruit trees. These learned men of horticulture say that fruit trees can be given too much vigor as well as not enough, simply by over-fertilizing them, especially with nitrogen. This, they say, causes the trees to grow wood and leaf fiber out of proportion to the amount of fruit they produce. To remedy the situation, that is, to cause the trees to produce more fruit and less wood, is simply to turn the orchard to sod for a year or two.

"One function of grass, which seems to have been overlooked, is to help govern the supply of soil nutrients the same as the soil moisture, especially that of the subsoil. So here, perhaps, is a solution to your orchard trouble.

"The same nursery also asserts that sod causes fruit to 'color up' better on the trees. This would indicate another important role sod has in an orchard. They indicate further that sod may even increase the mineral content of the fruit, since it is believed that the minerals taken into the fruit are the color-producing factors.

"So maybe sod isn't so bad for an orchard after all, *i.e.*, where both sod and orchard are given enough natural fertilizing."

The following is of unusual interest and was written by J. A. Vander Werf of Alto, Michigan:

"Your question raised in the April issue of *Organic Gardening* about using too much compost reminds me of one of the universal laws discussed by P. D. Ouspensky in his book, *In Search of the Miraculous.* Apparently the condition described results from a logic formulated on the premise that when a certain good has been discovered that the perpetual use of the means to develop that good will continue to bring about a constantly increasing benefit.

"Ouspensky's *Law of Octaves*

seems to indicate that the universe does not operate on straight lines but in curves. Phenomena which result at one time from a certain set of circumstances do not necessarily continue to reappear as a constant by the reproduction of the same preliminary steps.

"These same circumstances occur in all types of human activity and so any custom, no matter how apparently beneficial at one stage of development or period of time, if continued in the same fashion will finally lead to opposite effects even though labeled by the same name.

"Elbert Hubbard said 'Nothing is as permanent as change' and you recall that Tennyson suggested, 'The old order changeth giving place to new—Lest one good custom should corrupt the world.'

"To get back to organics—overstimulation, overdoing any one good can end in a retarded result. This no doubt has happened in poison spray and commercial fertilizer as well. To use a liberal dose of DDT on a plague of grasshoppers could have a beneficial effect. To use that good as a basis of logic that all insects everywhere should be destroyed is not sound in the ecology of nature as appears from results that can be enumerated.

"Instead of overdosing our soil with one material year after year whether it be humus or anything else seems the height of folly. Why not keep all things in balance? Return to the soil only what is taken out of it. Encourage nature's gifts by helping to fill in requirements. Certainly because water is good for tomatoes does not mean that we must make a pond out of the tomato patch. Let's fill in shortages. If soil needs building up let us put into it what it needs. If we want birds and bees, let's not destroy them or keep them away with poison sprays.

"More than becoming mechanical men we need to be awake to learn what our soil needs, to build healthy bodies, to study the needs of our animal and plant life so our ecology remains balanced. Nature is a stern disciplinarian and she is a great instructor."

An encouraging letter came from the pen of J. S. Vinson, 1509 Ketcham Avenue, Toledo, Ohio:

"*Organic Gardening* magazine has enabled me to transform my garden and flower beds, originally yellow clay into a friable loam, through ideas gained therefrom.

"You are to be commended for fighting against the use of chemical fertilizers and poison insecticides and ultimately these ideas, I believe will prevail.

"Your two articles 'Are we using too much compost?' should convince even your enemies that you are open-minded, and tirelessly seeking the truth concerning soil conditioning.

"I wish to assure you of my confidence in you and your efforts to effect sane and healthy practices in farming and in gardening."

J. C. Holcomb of P. O. Box 5206, El Paso, Texas, writes:

"I have been a reader of your two very fine magazines for quite some time and am thoroughly in accord with your views on organic gardening, etc. I think you are doing a wonderful job in bringing this information to the attention of the public and I know your influence is being felt.

"Your ability to retain an open mind has particularly impressed me—especially as evinced in your last two issues which discussed the matter of the use of too much compost in farming."

J. W. Windish of 411 N.E. 142nd St., North Miami, Florida, writes:

"Your editorial in the March issue shows you to be an unbiased investigator, hence I offer some of my observations on soils and the like.

"I have been unable to get satisfactory results in regards to quality on my everglades muck soil in spite of applications of granite and phosphate rock in quantities exceeding one pound of each per square feet.

"We once lived in the tropical forest where humus content was high in the soil and growth of plants very rapid. Most of the fruits were attacked by worms and diseases were plentiful in vegetables. Interestingly enough, we noted that while most of the Chinese cabbage planted in the natural soil would start to rot before maturing, those plants which were planted where a log had burned (destroying part of the nitrogen and increasing the minerals) did not decay at all. Certain plants (banana and papaya) which have evolved under such conditions were extremely healthy and productive. As an indication of the rapidity of growth there I measured banana plants 30 feet high one year from planting. A Balsa tree was 33 feet high in a year from planting the tiny seed. At three years the balsa is ready to cut for timber. This soil was deep and loose, and rains of seven inches were absorbed as fast as they fell except where the soil was packed by heavy machines and animals. The most curious thing was that squash, tomatoes, corn, and the like from this country would hardly grow and would not produce any fruit, while that secured from natives and therefore acclimated grew very well.

"We agree that mineralization is more important than humus content, although some soils already contain plenty of minerals it would seem. Such is not the case in any soil in this state and we are not convinced that there is any method which will produce insect and disease-immune vegetables under our climatic conditions, although increased vigor will help the plants to survive such attacks.

"In the comparison of the natural forest with garden practice we will do well to bear in mind that vegetables are a product developed by man and are not found except under his care. Forest trees do not require a high state of fertility to grow as does the vegetable.

"It is a curious fact that in the cold climate of the California coastal section extremely heavy applications of nitrogen are made in the citrus groves, and this is generally the only fertilizer used; yet the quality of the oranges does not indicate any excess in this element. Here in the warm climate of Florida nitrogen must be used in moderation and in combination with all the other needed minerals in balanced proportions, or the fruit (oranges) become puffy and insipid.

"Results of experiments may thus be seen to vary according to climate conditions under which the experiments are executed."

Mrs. Grace Mace of Tucson, Arizona, writes:

"I was greatly interested in your article 'Over-Composting' as it gave me the idea of just what I have done. I got some dwarf apple, pear, apricot and cherry trees, and they are bearing for the first time this year.

"I've tried to raise them organically with earthworms and manure. This year I had no grass but kept straw always at the base. I made a mistake following one of the nurserymen's advice in the first place. This year I permitted him to put manure under the trees. He put so much that I was shocked when I saw it. The apples and pears seemed to have taken it worse than the peaches and apricots. They have spindled up too tall and have scarcely any leaves up their tall stocks, with a bunch of leaves and fruit forming as big as your house at the top.

"I'm just sick over them. They haven't branched out sideways and have stayed small but straight up in

the air with bunches of leaves on top. I wanted to be sure they had no thrip so fed them, and then fearful lest my worms would walk out on me I fed them too much manure. Now what am I to do? I've been so thrilled and proud over my little orchard and I feel just sick as I fear I've ruined it."

Mrs. A. C. Leiter of Gurnee, Illinois, says:

"I am inclined to agree with your statement or query about whether we use too much compost—the forest is my criterion and there is but a thin layer but constant supply there, isn't there?"

Manuel Colvo of Kensington, Maryland, writes:

"It is raining here, hence this letter. It is about your inquiry as to whether gardeners are using too much compost. It would not be correct to say that I had premonitions, but I had had some wonderings along those lines. Compost breeds compost, or so it would seem.

"Not so long ago my unit of measure was the handful, then the shovelful, then the bushel basket; it is now the wheelbarrowful which I dump anywhere without any provocation. While I cannot complain of yield or of quality, the yields are not one-hundredth times as large as when the fistful of compost was all I could spare, and I have failures, all the more annoying because they cannot be explained.

"More than once my cabbage plants have grown to the size of a man's umbrella but made no head; my snap beans last year failed me, not one planting, but every one of the five or six plantings which I made in the season. In short, growths of everything are rank indeed—almost overwhelming, but the yields, though good, are not correspondingly large.

"So the problem needs to be looked into."

And finally we hear from O. A. Moore of Lincoln, Nebraska:

"I read with interest your articles on the subject Are we using too much compost?

"My experience has taught me that most of us do not know how to make real compost. Most of the compost that is used is only about half completed, thereby still containing nitrites and ammonia and other stimulating elements that the plant is forced to use and produces an unnatural growth.

"I once used a heavy coating of what I thought was fine compost on a patch of soil that I planted to potatoes. The vines grew up about 40 inches tall and then fell down and grew some more in length. I thought I would have a wonderful crop of potatoes, but when I dug the ground that fall I did not even get my seed back. I also fought bugs all summer.

"The next year I did not add any more compost of any kind, but I did add colloidal phosphate and greensand at the rate of 1,000 pounds per acre and planted this *same* ground to potatoes. The vines grew to about 24 inches tall—big sturdy vines. That fall I dug as fine a lot of potatoes as I ever hope to see. And a flavor that is only found in organic potatoes. These potatoes did not have to be loaded with cream and butter to be good eating. I had very few bugs."

conclusion

It is wonderful to have at hand such a valuable group of experimenters as are the readers of our magazines. Without them we would not have made half the progress that we did. That is why we have not hesitated to expose them to ideas that are only half developed. Their work and ideas complete them. We are a closely knit experimental group—our readers and us. Together we cannot fail.

(*To be continued*)

remarkable news about

*Science now proves that tooth enamel is a living substance, and therefore is affected by what we eat**

The electron microscope and radioactive tracers have at last proven an important theory: that "the skin of your teeth" is living material, and can draw nourishment from the body fluids. Thus *your diet can affect your teeth, and decay can be traced back to the soil.*

Organic farmers and gardeners have long noted, through actual observation, that tooth decay can be greatly reduced through eating organic foods, but dentists have always said that tooth enamel is hard as rock and once formed in childhood cannot be altered in any way.

Now along comes the Harvard School of Dental Medicine with scientific proof that our contention is correct. Their experiments are reported by Reidar F. Sognnaes, Dean of the School, in the June *Scientific American.*

Dr. Sognnaes stresses the fact that human beings suffer from tooth decay much more than the animals. Healthy teeth today are a comparative rarity among any peoples of the world. The more civilization, the more our teeth are subject to the ravages of decay, he says. He cites a University of Minnesota study covering the past 30 years that shows that the teeth of the people of this country are steadily getting worse—so much so, in fact, that we may have no teeth at all in another 1,000 years.

Why does a tooth decay? Certainly not because it is not clean. People started brushing their teeth regularly 50 years ago, but decay has become more rampant in the past half century than ever before.

Other theories as to the cause of dental decay fall by the wayside in the light of modern research. Heredity, contrary to common belief, has nothing to do with tooth decay. You do not have bad teeth because your forefathers did. Anthropologists have shown that people the world over are susceptible to dental caries, as the profession calls decay.

Nor does the "fermentation of carbohydrates" theory hold much water. Many authorities do not believe that the sweet foods we eat so much of today act as agents of decay through the formation of enamel-eroding acids, says Professor H. H. Nueman of the Columbia University School of Dentistry. In New Zealand, for instance, the people eat a great deal more protein and much less sweets than we do, yet they have three times as much tooth decay. (Of course, consuming a

*Editor's Note: Anyone wishing to read of Dr. Sognnaes work on enamel in more detail should secure a copy of the June, 1953, issue of Scientific American, which contains an article by him on that subject.

your teeth

lot of sweets can contribute to decay—and to poor health in general—if we eat them in preference to a well-rounded diet.)

Before Dr. Sognnaes' experiments, the most incontrovertible proof that diet caused caries and the host of related mouth and systemic troubles we suffer came from Weston Price, writing in *Nutrition and Dental Health.* This scientist showed that primitive peoples had very few cavities, malformed teeth, etc., until they ate commercially grown and refined foods. He further demonstrated that crowded teeth, smaller jaws and narrow faces are always found in the succeeding generation after natives go on white men's food.

The *British Dental Journal* reports on experiments in an English school. In 1939, chemically grown foods were used; 50 per cent of the students had 0 to 2 cavities, 32 per cent had 3 to 5, 18 per cent had 6 or more. During 1945 to 1949, when the school's entire food supply was organically grown, 98 per cent had 0 to 2 cavities, .8 per cent had 3 to 5. Not one child had more than 5 cavities!

The files of *Organic Gardening* contain numerous other reports and testimonials to the ability of organic foods to build healthy teeth. But we never knew exactly why naturally fertilized foods should have this power. The dental profession's long-standing belief that tooth enamel was dead matter was a direct contradiction of this.

Dr. Sognnaes' work proves the old belief wrong.

Tooth enamel, he found, is composed of epithelial (skin) cells, the same as those making up nails and hair. They start to form long before a child is born, in tiny, pencil-shaped crystals or prisms, so tiny 100 of them could fit inside the thickness of a human hair. Just to make the crown of one molar tooth takes at least 10,000,000 of them.

Under the electron microscope, Dr. Sognnaes found interlacing these prisms and even within them, *a sponge-like network of organic fibrils.*

The prism crystals are made of tricalcium phosphate, magnesium phosphate and calcium carbonate—the same substances as the dentin (inner core of the teeth) and bone—plus assorted trace elements. But the organic matter itself seems to be composed of a fibrous protein, plus a protein-carbohydrate compound which seems to serve both as a sort of protective coating over the fibrillar matter, and as a bonding material between the inorganic prisms.

This gave a new clue as to the

mechanics of decay. The individual crystal-and-organic units of which the enamel is composed are very tiny, much tinier than the microorganisms scientists believe cause decay. Therefore, there must be some kind of weakening, or actual destruction, of the organic and inorganic matter of the enamel—or the bond between the two —before these microorganisms can invade it.

If the enamel is dead, then acids from the bacterial fermentation of carbohydrates could very well be the weakening agent. But if it is alive, then perhaps it can exchange substances with the body fluids and receive strengthening or weakening agents this way.

Dr. Sognnaes reasoned that radioactive tracers would give the answer:

He knew that, with the aid of such tracers, other scientists had proven that bones and even fatty tissues which don't seem to change, are really not static. Their "building blocks" are continually shifting and changing, exchanging materials with the blood.

Did the same thing happen in tooth enamel? Dr. Sognnaes and his coworkers used radioactive isotopes of calcium, iodine, phosphorus and other elements to determine if such an exchange occurred in the hard substance that is enamel.

They found that it did! Ions of calcium and phosphorus in the saliva, were freely exchanged with chemically similar ions at the surface of the enamel prisms. Further, the ions were found to be able to penetrate right through the enamel and dentin—in both directions. Ions from the saliva can move into the tooth's inner pulp and back again freely.

This was conclusive proof that the enamel is not dead matter. Just like bone or other tough body tissues, it is capable of trading substances with the materials around it, even though it has no blood vessels coursing through it to carry these substances. It uses the saliva that surrounds it at all times.

But what of the materials it absorbs from the saliva? Dr. Sognnaes warns that some of these may make the teeth more resistant to decay; others may dangerously weaken its defenses.

If the foods we eat contain a goodly supply of beneficial elements, and no harmful ones, it is logical that the enamel will have strong defenses against the forces of decay. And since enamel is live matter, will it not, like the rest of the tissues in the body, be best nourished by the products of a live soil? Can a dead soil, one that lacks the vital interactions of organic matter, bacteria, minerals and the rest, produce healthy tissues and thus animals or people completely healthy in body and mind?

Fluorine is one of the trace elements in tooth enamel. It is absorbed from the saliva. Tests have shown that it seems to form a relatively insoluble compound through chemical action on the surface of the prism crystals and thus strengthens them against decay.

But as Dr. Sognnaes says, fluorine can only reduce decay, not abolish it. Present results certainly do not justify the artificial addition of it to our drinking water supplies. It has been found to protect the teeth of only one child in three, and no safe level of intake for the human body has been established. *Fluorine is a strong poison;* there is evidence that it is cumulative in effect.

Too, depending on one element to "cure" tooth decay can easily make us ignore plenty of other elements in good food that would do the job much better, and naturally, not artificially.

Proper nutrition, it would seem, is the only lasting answer to the universal and growing problem of decaying teeth. As long as our soil is deadened and impoverished with chemicals, we believe, we cannot have sound, whole teeth.

Photo: U.S.D.A.

Living soil needs living food. Organically rich compost and humus, not inert synthetics, bring natural fertility and life to the soil.

only the soil can feed plants

Developing a fertile, productive garden or farm starts with a sound understanding of fundamentals—at the ground floor

THOMAS POWELL, N. Y.

Feed the plant, or feed the soil. This is one fundamental controversy between organics and chemical fertilizers. The food and feed value of your crops, their resistance to disease and insects, their yields and quality are all dependent on the means and method by which they receive their nourishment.

How useful, or useless, is your soil? Is a plant's mineral content determined by the fertilizer that is placed in contact with its roots, that is, fed directly to it, with the soil serving only as a support for the plant? Can we by-pass the soil, as current policies of the chemical fertilizer industry dictate, and place "plant food" where the roots can pick it up without utilizing anything in or from the soil?

These ideas are both widely accepted and utterly false. They completely ignore everything we have ever learned about the soil. And current research into the basic components and properties of soil and their effect on plants are pointing up the falsity, and the danger, of this doctrine.

What is the soil? Let us listen to soil experts and plant physiologists, instead of the seductive "a bag of this will give you 10 bushels more of this" voice of fertilizer advertisements:

The soil, say the people who know, is a vastly complex, *living* substance. Like all living things, it needs food to

maintain itself and do its work—the work of turning out products that serve as food for plants. Chemical plant food, plus inert dead clay, rock, or sand, cannot produce healthy, vital plants.

Fertility, or the ability to supply food to a plant, is dependent on two things: the life in the soil, and its colloidal properties. These are basic to a soil; with one missing, or with either in improper amount or relationship to the other, soil is not soil.

Put a speck of healthy soil under a powerful microscope and even then you can get only a small idea of the teeming, active life within it. Estimates of the number of fungi, algae, bacteria and other organisms living in a single ounce of soil range from 500 to 700 million. This incredible number will add up to some 50,000 pounds of microorganisms in an acre-depth of 4 inches, or about 3 per cent of the total weight of the soil. How much, and in what proportion, of nitrogen, phosphorus and potash, as well as trace elements and other nutrients your plants receive is determined by the functioning of these minute animals. Their proper functioning, not to mention their very life, is dependent on how you feed your soil.

What we call organic matter is made up of the digestion products of these microorganisms and substances left when their dead bodies decompose. The more bacterial activity, the more organic matter and the darker your soil. A sterile soil is usually gray or nearly white.

The non-living portions of the soil can feed plants only in direct proportion to the activity of the soil's living parts. Clay, the most important of the soil's inorganic components, is composed of microscopic crystals so tiny it would take well over 10,000 of them, standing side by side, to stretch one inch. Because they are so tiny, we call them colloidal particles. They are themselves inactive. Their job in the soil is governed by the fact that each crystal carries a negative electrical charge. A negative charge attracts a positive one, in this case ions of potassium, magnesium, calcium, cobalt and other nutrients. Only competing ions or the work of microorganisms can tear these positively charged ions away from their clay jailers.

How much and how strong the attraction of the negative charges of the colloids are determines a soil's base exchange capacity, its power to hold nutrients. A low base exchange capacity means a soil can hold little plant food, regardless of how much we pour into it. That is, unless we pour in organic matter. For organic matter has a base exchange capacity, too. As the products of well-nourished microorganisms increase, so does the soil's ability to hold on to plant foods, to build up fertility. And some of the organisms are busy weathering rock particles—either there naturally or added in the form of ground rock fertilizers—to supply nutrients for the colloids to grab hold of. These interrelated activities supply a soil's reserve of fertility.

Soil colloids fight to hang on to the nutrients. But scientists tell us, if the nutrient ions are in a certain ratio to each other—for example, 4 ions of calcium to 1 of magnesium, etc.—they will have an easier time getting away from their colloid jailers. Availability of nutrients, therefore, depends on an exacting balance of them, something the most "balanced" chemical fertilizer would be hard put to achieve.

But chemical fertilizers don't even *try* to achieve this. Instead, they are applied on the basis of the nutritional needs of the crop. This is a false and very dangerous concept, as a long-term series of experiments by the Florida Experiment Sta. has recently proved.

Here are the conclusions reached by these researchers:

Healthy earth teems with living organisms, humus-producing earthworms. Soil fungi, bacteria and algae may total an incredible 700 million to the ounce on fertile land.

Photo: Gladys Diesing

The mineral content of vegetables (one of Florida's chief crops) is much more closely related to the organic matter content of the soil than to the minerals shown to be available in it by soil tests or added in the form of chemicals. "Soil type, or at least soil environment, was the main factor... which influenced mineral composition ... The fertilizer level had very little effect on mineral composition," states their Bulletin 488. The higher the soil organic matter content, the higher the mineral content of the vegetables grown in it.

Take phosphorus, for instance. Artificial phosphorus is said to be absolutely necessary for improved yield and quality of crops. But even when tests showed a large amount of phosphorus to be available, crop plants showed a definite lack of it—except those plants grown in a soil high in organic matter. Calcium and potassium followed the same principle. The organic matter obviously not only helps build up the nutrient content of soil, but keeps it in the exact balance needed to release the ions as plant roots call for them.

Another highly interesting conclusion was that the use of chemical fertilizers brought about increases in *size*, but caused decreases in *dry matter percentages*. In other words, the crops were "blown up" with useless materials like water, not enriched with more minerals or protein. Nitrogen was often increased in them, but mainly in the form of nitrates (a possible source of toxicity) rather than true protein. Protein, incidentally, is the human body's "reserve of fertility." Sugars and carbohydrates are immediately used forms of energy, while protein is stored up for body-building and protection of tissues. Thus it seems that artificial feeding not only gives the soil no reserve of needed materials, but denies them to us also. Celery grown on organic soil in these experiments was over 10 per cent higher in protein than celery grown on soils low in organic matter.

All this brings us to a point that may be more important than it seems at first. We know one of the bad

A new method of soil feeding: fish added to a flooded rice field stimulate underwater plant life and billions of soil organisms. Organic matter rises 1.4 per cent, rice yields increase 7 per cent.

Photo: U.S.D.A. Soil Conservation Service

effects of chemical fertilizer is that it harms soil bacteria. May not all the damage chemicals do be traced to this?

With no organisms to produce organic matter, the soil's base exchange capacity is lowered and minerals leach away. Good structure disappears, too. Erosion accelerates, yields drop, the farmer pours in more chemicals, the whole process goes on faster and faster. To try to feed a plant directly with concentrated soluble mineral salts, ignoring the vital role of the soil's biological life, is to deaden the soil. It can only lead to rapid deterioration and bankruptcy—not to mention the myriad illnesses caused by the "nutritional famine" brought about by eating malnourished plants.

Conversely, true lasting fertility and highly nutritious crops are to be achieved only by building up the humus content and biological activity of the soil. We are finally learning how plants obtain their food from the soil, what soil is, and how to maintain and increase its productivity.

There are no short cuts to farming except those short cuts dictated by Nature herself. Give her the proper materials to work with—organic soil foods—and she will feed your plants and maintain her largesse eternally.

The Arithmetic of Soil

Those of you acquainted with the theories of mathematics know full well of the basic law of diminishing returns. Where nothing vital is replaced, where no effort is expended for development or improvement—there can be nothing but a progressive decrease in results. How well this fundamental precept applies to our soil—the soil which gives us health and very life! The longer we replace nothing that is vital, the longer we spend no effort in developing and improving, the longer we foolishly and recklessly look to the ersatz compounds of ultra-modernized chemistry—the poorer our land becomes and the less it returns.

It takes no knowledge of higher math to realize that our soil needs care, replenishment, and ceaseless research to continue returning us good health. That very needed research, that constant investigation and searching ahead is the function of The Soil and Health Foundation, a totally non-profit organization supported by readers' contributions, which makes important grants to several universities and colleges for unbiased experimentation and study.

Make an investment today in a cause so vital to life. Send your contribution—no matter how small—to:

The Soil and Health Foundation (Dept. O.G.)
Emmaus, Pennsylvania

It's good arithmetic!

ornamental grasses

A variety of graceful, decorative grasses adaptable to the border or bouquet

L. PILLARS, IND.

Photo: Roche

Ribbon Grass.

In years and eras gone by, grasses have been treasured and cultivated for their ornamental value in gardens, borders, and dried bouquets. Yet, much of present-day horticulture seems to have neglected their graceful charm and utility.

Ornamental grasses range in height from the tiny tufted varieties to those of ten feet or more. These grasses are beautiful in form; their waving feathery plumes and soft pastel colors are ideal with the bolder colors grown in the garden. Many of them are suitable, when cut or dried, for winter decorations in the home.

Seeds of the perennial grasses are available and easily grown, and develop rapidly. Still others may be increased by division, one large clump can be cut into three or four pieces and these will soon grow to make nice sized clumps. The latter may then be divided in early spring as soon as the soil can be worked. It is advisable to follow this method with the variegated sorts as most of them will not come true from seed.

Crowded plants cannot develop, so allow at least a foot between plants. Their rapid growth and how quickly they fill the space allotted to them is amazing. As the perennials keep growing year after year they will require more space, or will have to be thinned out regularly. The annuals are easily raised from seed sown in early spring where plants are to stand. Thin to about ten inches apart when they are quite small; give them plenty of room to assure success. The common mistake of most gardeners in growing ornamental grasses is leaving them in a crowded condition and they fail to grow.

Some of these grasses do well in a dry location while others love the water. Planted in such spots, they cast beautiful reflections in pool or brook. They do well in any good soil with plenty of humus worked in around the roots both spring and fall. Most

Blue Fescue Grass

Spear or Feather Grass

Marram Grass

Ribbon Grass

of the grasses will adapt themselves to the soil condition and, given all the room they need, will grow into their full grace of height and form.

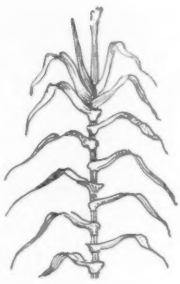
Hare's-tail Grass (*Lagurus ovatus*), also called Rabbit's-tail Grass, is an excellent edging plant preferring a sunny location and a well-drained soil. It grows to the height of 1 foot, with leaves 4 inches long and less than ½ inch wide. Spikelets 2 inches long are rather broad and have dense wooly heads. The plants look well in the garden and also make up into very attractive bouquets.

Cloud Grass (*Agrostis nebulosa*) is like soft, fine hair. It grows to 18 inches tall and likes a dry situation. Quaking Grass (*Briza minor*), growing to 1 foot, has spikelets that are flat and tremble in the slightest breeze. Brome Grass (*Bromus brizaeformis*), with its drooping spikelets, resembling those of the Quaking Grass, grows to 2 feet and the plant is often a biennial.

Blue Fescue (*Festuca ovina glauca*) produces fine blue-gray foliage about 9 inches high and does well in a dry location. Sandy soil and moderate shade is all that is needed for this beautiful little edging plant.

Stipa, is often called Spear, Needle or Feather Grass. It grows to 3 feet, having rolling leaves at the edges, while the spikelets are borne in clusters. *S. elegantissima* bears purple bearded spikelets in loose clusters half the height of the plant. These grasses are considered and treated as annuals.

Beach Grass (*Arenaria*), a genus of tall growing perennial grasses for the edge of pools or for growing along streams. Sow seed where plants are to stand. When the plants attain the height of 4 or 5 inches thin to 8 inches apart. It is a good sand-binder. *A. arenaria* (Marram Grass, Sea Sand-reed or Psamma) grows to 3 feet and has panicled flowers to 1 foot, with long branching rootstocks. Prefers a sandy soil.



Giant Reed Grass

Manna Grass

Eulalia Grass

Tropical Pennisetum

The Giant Reed (*Arundo donax*) is the largest of the grasses, except for the Bamboos. It is a perennial but will need some protection in the north. The plant grows from 8 to 20 feet in a single season, according to clime and soil. It bears loose feathery flower spikes 1 to 3 feet long which are very effective in the border.

Plume Grass (*Erianthus*) is hardy from New York, southward. This genus of the perennial grasses is tall-growing, and attains the height of 10 to 12 feet in a single season. Ravenna Grass (*E. ravennae*) is the tallest with leaves 3 feet long and about ½ inch wide, and a plume-like flower which grows to about 3 feet long. *E. divaricatus* and *E. saccharoides* may grow to 10 feet, have loose panicles 1 foot long and are very good used as accents in the border or garden. Planted in the formal garden they are most effective when used as accents in the center or for the corners.

Manna Grass (*Glyceria*) is a tall coarse perennial grass used in damp, poorly drained places—by the pool or pond. The elongated flower clusters are usually purple and are borne on branching racemes. Reed Meadow Grass or American Manna Grass (*G. grandis*) grows to 5 feet with leaves that are rough on the top side, growing to 1 foot long and ½ inch wide. May be grown from seed or the clumps may be divided.

Pampas Grass (*Cortaderia*) is a native of South America and one of the best and most popular of the ornamental grasses. It is tall-growing with silky blooms which are borne in late summer and are beautiful for many weeks. Cut when fully developed, the plumes may be dried and used to give an airy grace to winter bouquets. This very decorative grass is not hardy so must be grown as an annual. It thrives in sandy soil, in a sheltered location.

Eulalia (*Miscanthus sinenis*) is the best ornamental grass for the northern regions. Once established, it will remain for years. Good soil and enough moisture will develop this grass into attractive clumps for border or around the lawn. The leaves are 3 feet long and 1 inch wide, and have a large central vein which is a ridge-like extension of the petiole or main ridge on the leaf-like part. The panicles of silky plumes grow to 2 feet long. The leaves of *Var. variegatus* have white or yellow stripes. Those of *Var. zebunus* (Zebra Grass) are yellow banded.

The Ribbon Grass (*Phalaris arundinacea picta*) with green and white stripes, grows to about 5 feet tall and makes thick clumps in the border.

Pennisetum, grasses native to the tropics and sub-tropics, are grown for their ornamental foliage. There are both annual and perennial varieties and either make good garden subjects. Seed started indoors or in the hotbed will get an earlier start than those planted out-of-doors. They prefer a sandy loam in a well-drained soil and a sheltered site. In the fall the plants may be lifted and placed in the cellar or under glass. *P. japonicum* has foxtail mahogany plumes tipped white. *P. ruppeli* grows to 4 feet and has narrow leaves 2 feet long. The flower spikes, a foot or more in length, are purple, coppery-red, and rose.

Supplying soft tones to the garden is the silvery Beard Grass (*Andropogon argenteus*) growing to about 3 feet. It bears silver plumes which are good for drying and then make an effective contrast in the winter bouquet.

Love Grass (*Eragrostis*), some annuals, some perennials, are valued for their ornamental sprays of delicate beauty. The small panicles are carried in open spikelets, growing 4 to 15 inches long. *E. elegans, E. interrupta* and *E. japonica* all grow to 3 feet and are very useful in dried bouquets.

Uniola, one of our native perennial grasses, known as the Spike Grass, in-

cludes several varieties. There are *U. latifolia* and *U. leptochloa fascicularis.* The former, a native of America, is a perennial grass, growing to 5 feet in height. Planted for landscape effects, it is ideal as a background for a border planting, and is hardy from Pennsylvania to Texas. The latter variety is used for the same purpose, but is a native of the warmer and more temperate parts of Eastern United States. It grows to 2½ feet, and has thread-like leaves 8 inches long and flower panicles to 1 foot long. It thrives in a sandy loam and a good top dressing of humus.

Everyone knows the corn or maize of Mexican origin. It is grown for its handsome foliage. They are very good ornamentals for the garden where a bold effect is needed. Their large coarse leaves of all varieties are variegated, white, pink and cream. As we know, corn needs a rich soil with plenty of humus and a good supply of moisture in the growing season.

It seems through the years ornamental grasses have been neglected. Once you plant one or two varieties, you will plant more and more, and be enhanced with their beauty and grace in border, garden and bouquet.

---

more than trees die

More than trees die when a forest is burned. Loss of the lumber and other tree products is grievous enough, but even so it is only one item in the sum of the disaster.

Many of the rest are tangible items, assessable in dollar damages. Others are not so easily itemized, but their value will be recognized none the less, even by the most utilitarian.

Forests are inhabited places, shelters for all manner of beasts and birds. The fate of these, in a major forest fire, is dreadful: terrified flight until limbs or wings will no longer carry them, agonized death in the flames. Afterwards—no sport for the hunter with either gun or camera, over that blackened area, perhaps for several human lifetimes.

Fish, too, are sufferers. Forest streams are typically cool and swift—the kind of water that trout delight in. In the worst forest conflagrations, the fish are often killed outright by the sheer heating of the water; but even where the fire is not severe enough for that, the after consequences are just as fatal to the fish.

Polluted with poisons from roasted plants and dead fish, befouled with charred fragments of destruction, muddied by soil exposed to erosion, heated by the beating sun with no more leafy canopy to intercept it, the streams become totally unfit to support the kind of life they once contained. They become slum waters, or even dwindle to mere trickling remnants of their former selves.

The very soil itself becomes the victim of a forest fire. The forest floor is a complex always in a delicate state of balance. Roots of trees and lesser plants, burrows of mice and moles, myriads of insects and worms and other creeping things, and unseen hosts of microorganisms are all essential parts of it. Their death leaves the soil mere carrion, no more soil than a charred trunk is a tree, or a live-roasted carcass a deer or a grouse.

Fire season in the country's forests will soon approach its height. It is to be hoped that all Americans who have occasion to be in our national forests this year will observe very carefully the order of the day, "Hold your fire!"

Reprinted from *Science News Letter*

COURSE IN ORGANICS

By J. I. Rodale

ORGANIC MATTER

Lesson VII — Carbon

IN considering organic matter it is good to know something about *carbon* which makes up so much of it—at least 40 to 50 per cent. Carbon is the element at the base of carbohydrates. We eat it, but depending upon what other elements it is combined with, and in what form, hinges the fact whether it is a poison or not. Carbon rarely stands alone as it does in a diamond, which is pure carbon. In coal, in charcoal, in graphite, in a plant, it is in compound form. In limestone it is in the form of calcium carbonate; in washing soda it is sodium carbonate. You can eat calcium carbonate. It is given to babies in the form of lime water, but if you were to consume sodium carbonate you would not live long.

In the air and in the soil carbon is found in the form of carbon dioxide —CO_2—a gas consisting of one atom of carbon and two of oxygen. It is a colorless and odorless gas which is used in making carbonated soft drinks. When one atom combines with only one atom of oxygen we have CO, carbon monoxide, a violent poison which comes from the exhaust of automobiles.

Carbon dioxide is present in the air to the extent of only .03 per cent which means three parts out of 10,000, but its presence in the atmosphere is absolutely necessary for the existence of man, plant and animal. Without it life would come to an end. It is the source from which the plant gets its carbon for the energy it needs to grow. Carbon forms carbohydrate which is an energy food, and it is one of the most important foods for man, plant and microbe. In addition to furnishing energy, part of this carbon is converted into living protoplasm.

Carbon dioxide is a very heavy gas and therefore in a silo, where the fermenting matter is giving it off constantly, there is danger of suffocation if a person enters without first leaving the doors wide open so that the gas can escape. Being heavy, it accumulates at the bottom of the silo. In bee breeding it has been found that giving the queen bee a carbon-dioxide gas anesthetic she can lay eggs which hatch into drones. Stutterers have been cured by inhaling carbon dioxide.

THE CARBON CYCLE

When organic matter decays, carbon dioxide is given off. This process is the basis of life itself for this gas goes into the soil atmosphere and is used

again by growing plants through their leaves. This is known as the carbon cycle. In this cycle not only does carbon dioxide come from decaying organic matter, but also in the respiration of plant roots. Some of it is also brought down in rain water. For many years it was believed that plants secured their carbon only from the atmosphere, but Lundegardh in 1924 discovered that decaying organic matter in the soil was a more important source. Modern farming, however, with its accent on chemical fertilizers and the neglect of the maintenance of adequate supplies of organic matter, reduces the quantity of carbon dioxide in the soil. This may seriously reduce crop yields.

It is known that plants can use much more carbon dioxide than is normally present in air. In Germany recently experiments have been conducted to add carbon dioxide to the air of greenhouses in order to make plants grow better.

We often hear the word photosynthesis in connection with the carbon cycle. This refers to the manufacturing process which goes on in a plant's leaves, which is made possible through the action of sunlight, and which takes in the manufacture of plant food out of carbon dioxide, water and other nutrients. Sunlight is the basis of photosynthesis.

ORGANIC MATTER

Scientific workers have found that the amount of carbon dioxide in a soil is directly dependent on the amount of organic matter present. It rises and falls with it. In fact the amount of carbon dioxide escaping from soil has been used as a measure of the amount of organic matter present in the soil. The factors that aid in decomposition of organic matter are the same factors that are good for the production of carbon dioxide—namely, high temperature, sufficient moisture and adequate aeration. In one experiment it was shown that four times as much carbon dioxide was given off from a manured as compared to an unmanured soil.

COMPOSTING

The question is, with regard to the production of carbon dioxide in a soil, which is the better method—composting of organic materials, or applying them raw to the soil. With a little study one comes to the conclusion that the latter is the better method. I would like to quote from a letter sent me by Faulkner, author of *Plowman's Folly*, a few years ago:

"Composting, unless done with such perfection that none of the gaseous carbon dioxide escapes, must necessarily be less efficient in producing carbonates from the soil—per ton of original organic matter. When raw organic matter is intimately mixed with soil (so intimately that there are no bunches) each fragment is surrounded by soil; and the carbon dioxide it releases immediately finds the minerals upon which it can work; and abundance of plant food carbonates necessarily results. I believe that in this way the maximum effect from a given amount of organic matter is obtained. It is conceivable that equal success might be had by compost methods, but for large areas I feel sure that composting can be no better; besides being laborious as compared with the mere mixing in by machinery of a green manure crop."

I am certain, from observation and study, that in composting, large amounts of carbon dioxide dissipate into the atmosphere because of the heat generated. For this reason an anaerobic form of composting, where as much air as is possible is kept from the fermenting matter, will be the means of conserving more of the carbon.

DYNAMIC QUALITY

In Lesson IV of this series we studied the value of organic matter on the move—its dynamic quality, and learned that the soil benefits if raw material

is placed there to decompose. In the same way that there is a continuous stream of nitrogen coming from such material, there is also a faster going off of carbon dioxide. In this respect we can also bring in the carbon-nitrogen ratio which we studied in the previous lesson and which affects the amount of carbon dioxide available to the growing plant. In finished compost the carbon-nitrogen ratio is much lower than in raw organic material. The rate of going out of nitrogen as well as carbon is therefore less in the former. The compost holds these nutrients for a more gradual release. As far as carbon is concerned a material like sawdust, which may have a carbon-nitrogen ratio of 400 to 1 can be an excellent source of carbon, if an excess of carbon is required. Incidentally, as stated in the last lesson, there is evidence that too much carbon will cause disease in plants.

CHEMICAL FERTILIZERS

The use of chemical fertilizers retards the formation of carbon dioxide for many reasons. Its use results in lower moisture, aeration, and even temperature. Tests have shown that a soil high in organic matter will have somewhat higher temperatures. Certain fertilizers, like nitrate of soda, cause a severe hardening of soils, reducing their aeration, and good aeration is important so that a sufficient supply of carbon dioxide might be given off. It is a known fact that many farmers who use chemical fertilizers forsake the manure pile and overlook the use and importance of organic matter. Organic farmers and gardeners can have a feeling of security that there is sufficient organic matter in their soils to supply a steady and adequate stream of carbon dioxide gas.

BACTERIA

Just as the plant must have carbon dioxide so must the microorganisms of the soil. It furnishes their energy. In fact, the formation of carbon dioxide from organic matter is almost entirely due to the action of bacteria. They make it and use it. The soil bacteria and other microorganisms also produce carbon dioxide as a waste product of their own metabolism.

A POSSIBLE FALLACY

In the average text-book on agriculture one usually reads that the action of soil acids upon rock or mineral particles in the soil results in their solution by a solvent action, thus making them available as nutrients for plants. They are supposed also to release minerals from clay and humus. This is axiomatic and accepted by practically all soil scientists. Some of the carbon dioxide in the soil, combining with water, becomes carbonic acid and it is generally believed that it raises the capacity of the soil water as a solvent, as just described. But it is possible that this may be a fallacy.

A scientist whose work we are following has performed experiments which indicate that this is not so. His experiments and observations lead him to believe that it is the action of amino acids of the protein of decaying organic matter which does this work. However, he does not wish to announce anything about his findings until further experimentation is performed that will establish beyond a doubt the accuracy of his earlier experiments. If this were to be proven correct, then the question occurs. What other beliefs ingrained in present-day scientific agriculture are erroneous?

MISCELLANEOUS

A sufficient supply of carbon dioxide in the soil will create a healthy, dark green foliage in plants. The abundance of carbon dioxide in soil varies at different seasons. In certain experiments it was found highest in May and in August. This may be a combination of seasons when organic matter decays most readily, plus the time when organic matter is plowed under—added organic matter put in the soil by the farmer, plus crop residues plowed under.

There has been a tendency in recent years to apply carbon black to the soil to give it a darker color for the purpose of raising the soil's temperature.

What the effect of this form of carbon is, is not yet fully understood. A higher temperature will cause bacteria to work faster and may increase yields, but it is possible that ingredients of the carbon black, other than carbon, may gradually affect the soil's ability to produce.

ARTICLE ON CARBON DIOXIDE

In the April, 1946, issue of this magazine an article appeared, written by Howard Dolf, which is being reproduced here because it shows good thinking on the subject:

THE ROLE OF CARBON DIOXIDE IN COMPOSTING

By Howard Dolf

Many writers on this subject favor the idea that the improvement of the soil, by addition of properly made compost, constitutes the principle factor by which better plant growth is achieved. But this writer would like to call attention to the fact that the condition of the atmosphere which surrounds the aerial parts of the plant is just as important as the condition of the soil in which the subterranean parts of the plant are located. No matter how perfect the medium is in which the roots of a plant are placed, without a proper environment for the leaves to function in no plant can be expected to lead a normal and healthy life.

It is an accepted fact, proven by scientific experiment that carbon dioxide is as necessary to the life and growth of a plant as oxygen is necessary to animal life. The plant needs a constant supply of carbon dioxide. This is supplied by the air which surrounds the leaves of the plant. As air is more or less in constant motion a fresh supply of CO_2 is always available. But it might be interesting to know that the proportion of CO_2 to air is small—3 parts per 10,000 by volume—so that a constant supply of fresh air is quite necessary for the plant in order to thrive.

Now, since the world contains a large amount of plant life, one would begin to wonder if, sometime, the CO_2 supply would not disappear. However, nature has provided for a continuous supply of CO_2. All dead organic matter decays and ferments back to the simple elements it was built up from, mainly CO_2, water and traces of mineral salts.

This brings us back to our main topic: the role of CO_2 in composting. Besides improving the soil, compost is a material that is at just the proper stage for conversion into a ready supply of CO_2 for the plant. Edwin C. Miller, in his book *Plant Physiology*, records the work of several experimenters studying the effects of an increased supply of CO_2 above normal atmospheric conditions on the growth of plants. In most cases, they discovered that plant growth was increased and that the plants were in a healthier state when the supply of CO_2 was greater than the normal 3 parts per 10,000 by volume. It was noted also that several of the experimenters remarked that an increase in CO_2 concentration could be produced by proper manuring with organic fertilizers. As an added thought, it would seem logical to me to suppose that the good effects caused by loosening the soil near plants releases CO_2 which has been trapped in the earth. Also the removing of weeds allows more CO_2 to be used by the cultivated plants.

The increase in CO_2 concentration may also cause fewer insects on plants where compost is used. Interested persons have noticed that in volcanoes where the concentration of CO_2 is very high no insects can live.

INSTRUCTIONS

Read each question and refer back to the article for its answer. Then read the questions a second time, attempting to give the answers from your mind. In no instance should answers to the questions be mailed to us, nor can we enter into correspondence concerning this course which is primarily intended for the benefit of each reader. Correct your own written answers by comparing with the text of each lesson and mark your work accordingly.

QUESTIONS

1. Approximately what proportion of organic matter consists of carbon?
2. How much carbon dioxide is present in the air? Why is this presence of great importance?
3. Explain briefly what is meant by the carbon cycle.
4. What is photosynthesis?
5. Identify the factors that aid in the decomposition of organic matter and the production of carbon dioxide in the soil.
6. With regard to the production of carbon dioxide, why is the application of raw organic materials to the soil considered a better method than composting?
7. In what way is the anaerobic form of composting a desirable means of conserving carbon?
8. How do the carbon-nitrogen ratios of raw organic material and finished compost compare?
9. If an excess of carbon is required, why would a material such as sawdust represent an excellent source?
10. Explain the effect of chemical fertilizers on the formation of carbon dioxide.
11. In what way is carbon dioxide vital to the bacteria and other microorganisms of the soil?
12. How is a sufficient supply of carbon dioxide reflected in the foliage of plants?
13. What are some of the benefits to soil and plant life of an increase in CO_2 concentration?

REVIEW QUESTIONS

How well have you retained the essentials of Lesson VI? Here are a few review questions which have been simplified and are answerable by *True* or *False*. Test yourself (avoid guessing) and then check with the answers on page 60 of this issue.

1. As a chemical element, carbon may exist in a pure state, as a gas, an acid, or in other compound forms.
2. Raw organic matter has a higher carbon-nitrogen ratio than decayed matter.
3. The carbon-nitrogen ratio of the soil is on the average much higher than that of organic matter.
4. Microorganisms of the soil require more protein than carbohydrates.
5. There is no difference in the extent of nitrogen movement in the application of either fresh organic matter or humus to the soil.

Readers are urged to study the concurrent course on "The Soil" in *The Organic Farmer*, Emmaus, Pa., $3.00 a year; $7.00–3 years.

Photo: U.S.D.A.

Adding organic matter to the soil by digging parallel trenches and burying leaves in them in the fall.

Garden Magic

with surface compost

Building fertile soil with a method that is practical and easy for any gardener

PAULA SEIDEL, MICH.

Reprinted from *The American Home*

"Good heavens," exclaimed my friend. "What have you done to your garden? The last time I saw it, it was a mess of sticky red clay you could hardly step on without getting mired."

"Oh, but you should see it from the air, as I did last Sunday. Compared with other gardens around here, it looks like a jungle. What we did was simple, but it worked." And this is what it was:

In 1942, when Victory Gardens were called for, we decided to abandon the old, disease-ridden plot we had been using, for some good, fertile soil. The best bet seemed to be our clothes-yard, which apparently had never been cultivated but which had been for some years a chicken and rabbit run. But the soil (largely red shale which, I understand, is only partly decomposed rock) was such a heavy, sticky clay that the children had once used it for modeling. The first time I dug into it, the only sign of life I discovered was a pathetic earthworm about as big as a pin.

At that time all I knew about soil restoration was (1) the traditional use of barnyard manure—which was out because we didn't have any; (2) a magazine report by a columnist who had buried garbage in a poor spot in her garden and soon found it, instead, the most productive part; (3) an article by a farmer who built an inch of good topsoil by disking in all kinds of organic waste—old cornstalks and cobs, chopped up roadside brush and tree prunings, sawdust, straw, weeds, waste from local canneries and slaughter houses, etc. Stimulated by those experiences, I systematically dumped on the garden that winter all the waste materials I could find—wood ashes, garbage and vegetable trimmings, even the vacuum-cleaner dust. In the spring, after adding leaves raked from the lawn, we mixed and spread it all and plowed it under.

That summer the garden was fairly successful, although the soil still couldn't be touched when wet; after a rain I wouldn't even walk on it to pick lettuce. But my efforts paid off, for the soil did not bake, as did all the other clay in the neighborhood. As lack of space was a problem, especially for our favorite crop, peas, I spaced all my rows 13 inches apart (just the width of my cultivator) and put a row of peas between each two rows of the longer-season things. As

A message from Falkner & May

Your Age...Your Health and Your Diet

Some Important Facts About Natural Vitalized Foods for Serious-Minded People Over 35.

If you are over 35, there's no need to tell you that buoyant, vigorous health is a most cherished possession. Like most people who have passed this milestone, you probably have experienced periods when (for no apparent reason) you felt tired, listless, rundown... lacking the will and the energy for active, exciting living. Probably your main interest in life today is to *regain* the spirited zest for living, the energy and vitality you enjoyed in younger days. Did you ever stop to realize that in many people that "middle-aged feeling" is caused by nothing more serious than deficiencies in the daily diet?

In a recent issue of *Prevention*, the dynamic health magazine published by J. I. Rodale, a feature article contained this statement: *"Nutritionists have shown that a correct, natural diet, including ample vitamins and minerals, will do more to prevent the ravages of old age and the diseases of old age than anything else."* It is a fact that a balanced diet of natural vitalized foods, containing all the enriched elements the body craves, can do much to keep you feeling young and vigorous, eager to enjoy all the thrills and excitement of an active life. Yes, for people over 35 in search of good health the most important concern is a balanced daily diet of natural vitalized food... a diet rich in the important vitamins and minerals. But, as this forthright magazine has shown, the average American diet today is sometimes woefully lacking in these all-essential vitamins and minerals.

Do you know that the vital factors of *plant* foods (vegetables and fruits) are dependent upon the type of seed, the quality of the soil, how it is fertilized, whether fruit is ripened by artificial or natural means? Also how they are cooked or preserved? Do you know that *animal* foods (meat, milk, eggs, butter) may have the important factors destroyed by improper storage, processing and cooking? Vitamins are present in foods only in small quantities. Processing, storing and cooking tend to affect the vitamin content. The natural, unrefined foods of our forefathers were richer in vital elements than the highly-refined and processed foods of today. In the highly-refined state of modern living many of us, though seemingly well-fed, actually are victims of vitamin and mineral deficiencies.

What's the answer? How can you protect yourself (and your family) from deficiencies which may endanger health and often are at the root of "let downs" in energy and vitality? One easy, simple way is to supplement your daily diet with vitamins and minerals in *concentrated* form. But remember... to make certain you are replacing all the vital factors missing from your diet you must insist on vitamins and minerals prepared only from natural vitalized sources. Many such products sold in drug stores (and even in health food stores) today are *synthetic*... made from coal tar derivatives. Can coal possibly contain all the vital nutrients present in natural foods?

This special insert has been prepared to acquaint readers of *Organic Gardening* with a line of vitamin and mineral concentrates that is 100% *natural*... presented by Falkner & May, one of the best-known names in the American health field... with over 35 years experience in formulating all-natural diet supplements. Turn the page and read all about these guaranteed natural products.

➡ ➡ ➡

Start Your Family Now on the Ra

FALKNER & MAY'S

The Multiple Vitamin-Mineral Formula for adults and children . . .

Falkner & May's Master Formula is Endorsed and Recommended by *Bernarr MacFadden* . . .

At the age of 85 this renowned physical culturist says:

"At last I can offer all my friends, students and readers a group of vitamin products which I know to be pure, natural and organic. Falkner & May's vitamin products are made from only the finest ingredients which are laboratory tested and combined in such a way as to bring you the maximum and most beneficial results. This group of products is the result of my years of experience in this field. I sincerely hope that you feel as well as I do, after using them." —Bernarr MacFadden

Build Up Resistance Now For the Cold Season

Yes, *right now* is the time to build up your resistance, to fortify your bodily vigor and energy in preparation for the ravages of Winter. One way is by *making certain* that you are getting an adequate *daily supply* of the all-important Vitamins and Minerals.

Have you ever stopped to take inventory of yourself and your family . . . and your nutrition? Did you ever stop to realize that perhaps those Winter sniffles and colds, that general listless, run-down "cold weather" feeling may be traced back to deficiencies caused by *careless eating habits* during Summer months?

Remember: You cannot live on Vitamins *alone.* Neither can you live *without* them. Of course, the best source of vitamins is food. But often Summer diets lack the well-balanced menus necessary for adequate vitamin intake.

To protect yourself and your family from deficiencies which may endanger health . . . try Falkner & May's MASTER FORMULA. Approved by a nationally-known testing laboratory, Falkner & May's MASTER FORMULA is made from 100% natural vitalized foods which contain all the enriched elements the body craves. Helps build vigor and vitality, maintain buoyant good health.

Ideal for both young and old alike. Try it . . . and see for yourself!

ad to Better Health Next Winter!

MASTER FORMULA

guaranteed made exclusively from 100% Natural Vitalized Foods

- Vitamin A
- Vitamin B-1
- Vitamin B-2
- Vitamin B-6
- Pyridoxine
- Calcium Pantothenate
- Phosphorus
- Copper
- Sulfur
- Manganese
- Magnesium
- Vitamin C
- Vitamin D
- Vitamin E
- Biotin
- Rutin
- Calcium
- Choline
- Inositol
- Folic Acid
- Iron
- Iodine
- Fluorine
- Zinc

Falkner & May's MASTER FORMULA is concentrated from the following FOOD sources: YEAST, KELP, FISH LIVER LIPOIDS, PURE CRYSTALLINE B-12, plus the healthful addition of: WHEAT GERM, WILD ROSE HIPS, PARSLEY, ALFALFA, TOMATO, WATERCRESS, SPINACH, PIMIENTO, LECITHINATED SOYA, and RUTIN from BUCKWHEAT. It's all-natural!

...Plus ***DESICCATED LIVER • BONE MEAL • WILD ROSE HIPS AND THE AMAZING "RED" VITAMIN B-12***

One of America's Best-Known Vitamin Combinations

Falkner & May's MASTER FORMULA is an all-inclusive vitamin-mineral supplement from natural sources... with the dramatic new factors: Wild Rose Hips, purified edible Bone Meal and Vitamin B-12, described recently in Reader's Digest in a story of blood regeneration that has thrilled thousands.

This all-embracing natural formula brings the sensible precaution of a daily supplement of Vitamins and Minerals within reach of every family. Now you can forego the many combinations and dozens of tablets or capsules formerly purchased separately and receive them complete in Falkner & May's MASTER FORMULA.

Comes in an easy-to-take capsule. For small children merely lift top off capsule and add MASTER FORMULA to foods, cereal, milk.

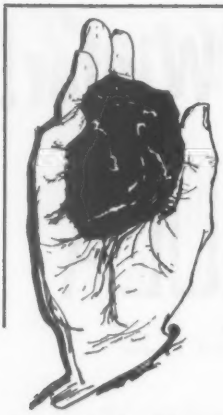
50 capsules	$ 3.50
100 capsules	6.50
200 capsules	12.00
300 capsules	17.00
600 capsules	32.00
1000 capsules	50.00

Remember: Natural Vitamins and Minerals are *best* for you! So try Falkner & May's All-Natural MASTER FORMULA.

☞ ***Order Direct Postpaid • Money Back Guarantee***

FALKNER & MAY, INC.

Department 8-G
1445 First Avenue, New York 21, N. Y.



Is COAL a "Vitalized" Food?

If you are suffering from a Vitamin or Mineral deficiency, this may be a very important question. Remember: there is only one way you can possibly replace all the vital factors missing from your regular diet . . . with Vitamins and Minerals from **natural vitalized food** sources.

Today there are hundreds of Vitamin and Mineral products on the market. The vast majority are SYNTHETIC . . . made from coal tar derivatives. **Is coal a natural vitalized food?** Can coal tar . . . or products derived from coal tar . . . possibly contain all the vital nutrients present in natural foods?

You know the answer! So always insist on Vitamins and Minerals from natural vitalized foods. These contain the enriched elements your body craves.

. . . For Natural Food Vitamins and Minerals

America's Favorite Brand is Falkner & May

Falkner & May is a firm founded on FAITH . . . faith in the superiority of 100% Natural Diet Supplements; faith in the intelligence of the American people to recognize this superiority; faith in public loyalty to a firm that offers only a natural product of very finest quality . . . or none at all. This faith has brought a wonderful success. Today the most popular brand of Natural Vitamins and Minerals in America is Falkner & May.

Wheatene

New Wheat Germ Oil Formula!

You know the value of Wheat Germ Oil . . . one of Nature's richest sources of the valuable Vitamin E. Now . . . try Falkner & May Wheatene . . . a new and improved 100% natural formula. Each capsule contains full .64 mg. of Vitamin E. Comes in 6-minim capsules (twice the amount and potency of customary 3-minim size). Capsules are oval . . . easier to swallow. Sealed . . . for protection against deterioration and rancidity and to safeguard potency.

100 capsules . . . . . **$ 2.00**
300 capsules **5.00**
700 capsules **10.00**

Aydee

(Vitamins A and D . . . in Wheat Germ Oil)

Vitamin A is necessary to keep up the normal resistance to infection of nasal, sinus and respiratory tissues. **Vitamin D** is the important "sunshine Vitamin." **Vitamin E** (found in Wheat Germ Oil) helps your body utilize A and D. You get ALL THREE in Falkner & May's AYDEE. Each sealed 3-minim capsule contains:

5000 USP Units Vitamin A . . 125% MDR*
1000 USP Units Vitamin D . . 250% MDR*
. . . in a base of pure Wheat Germ Oil.
(*Minimum Daily Requirement)

Try this wonderful new combination . . . it is a 100% Natural Formula! You'll like it!

100 capsules **$2.75**
200 capsules **5.00**

☛ ***Order Direct Postpaid***

Natural B Complex

(Now with Extra Vitamin B-12)

Reader's Digest calls it the "miracle vitamin" . . . B-12. Now this wonderful new vitamin is added to Falkner & May All-Natural B Complex . . . to give you a truly superior source of this vital factor. For vigor and energy your body needs a **full quota** of Vitamin B factors. If there is a deficiency, you tire easily, may feel listless and run down, even though nothing is organically wrong.

Falkner & May Natural B Complex is a combination of highly-concentrated primary yeast (about 30 times stronger than regular yeast) containing Riboflavin, Thiamin, Niacin and all trace elements natural to yeast, plus pure Vitamin B-12.

100 capsules . . . . . **$ 3.00**
200 capsules **5.00**
500 capsules **10.00**

Garlic Capsules

Today modern medicine is rediscovering many fine values of this age-old vegetable remedy. Falkner & May Garlic Capsules are made from finest garlic oil known. Odorless. Tasteless. A pure natural product.

100 capsules **$1.50**
400 capsules **5.00**

● ***Money Back Guarantee***

FALKNER & MAY, INC.

Department 8-G

1445 First Avenue, New York 21, N. Y.

soon as a row of peas had borne, I would pull the vines and use them, with lawn clippings, as a mulch in the 26-inch space left between the remaining rows. This kept weeds down and also prevented the soil from drying out. A little soil scattered on the mulch started it decomposing, and as the earthworms worked on it, they added valuable humus to the soil. Thus (and by setting out tomato, cabbage, pepper, and broccoli plants after harvesting the first radishes, lettuce, etc.) I get two crops from practically all my garden. At the same time, by adding, year after year, all kinds of green waste in summer, kitchen waste in winter, and some four inches of leaves each spring, I have put back into the soil more minerals than I have taken out, even with my two-crop system. And the garden has increased its production until, in 1948, I broke all my records by loading our table with top-quality vegetables all summer, giving away sacks of them, canning 150 quarts, and filling a locker with frozen goods. The only manure I've had has come from the few broilers we raise each spring; it has been worked in around the choicest plants or put under the mulch. Thus I have proved beyond a doubt that, contrary to the usual idea, it is not only possible but easy to build up a soil by surface composting with organic materials without using fertilizers.

I am constantly discovering new materials that I can use. For example, I take all the black walnuts I can find to the garden, pound off the rich black shucks and scatter them around; they seem to be nature's answer to the search for black soil. In harvesting vegetables, I top them right there and, when the trimmings wilt, cover them with soil so the worms can start turning them into rich black humus. Incidentally, the puny little creatures of the past have become king-size night crawlers which help aerate the soil while enriching it with their castings. In return, I give them coffee grounds, egg shells, cornmeal, and now and then, as a treat (I hope) cake-frosting scrapings from plates and bakery boxes.

An important feature of this organic soil building, in my opinion, is a marked freedom from insect pests. I had heard that bugs are less likely to touch healthy plants and that plants can be sick because of soil deficiencies, and my experience bears that out. My early gardening efforts were a continual fight with plant lice, beetles, rust, wilt, etc., as I spent hours dousing everything with sprays. But last year I counted only two tomato worms, four cabbage worms, and a few aphids on the turnips. Both vegetable and flower plants were big, luxuriant, healthy things that gave me more from my postage-stamp plot than some of my neighbors got from most of an acre.

Last fall, when pulling some root crops, I shook rich *black dirt* from them. Not a vestige of that original sticky red clay remains. I don't know how scientific my theories and methods are, but I have seen them work a miracle in my red shale garden.

A simple slat bin for accumulating house and garden wastes and turning them into rich, soil-feeding compost.

Photo: Farm & Garden Research Associates

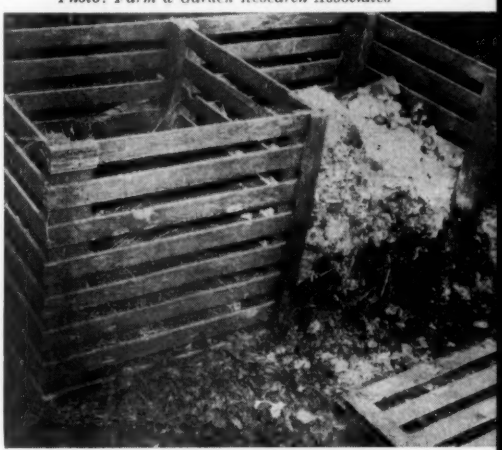


Photo: J. Horace McFarland Co.

Rose-growers who delight in such eye-appealing blossoms as this lovely Lowell Thomas rose can add an intriguing and creative note to their gardening pleasures by learning to bud their own successfully.

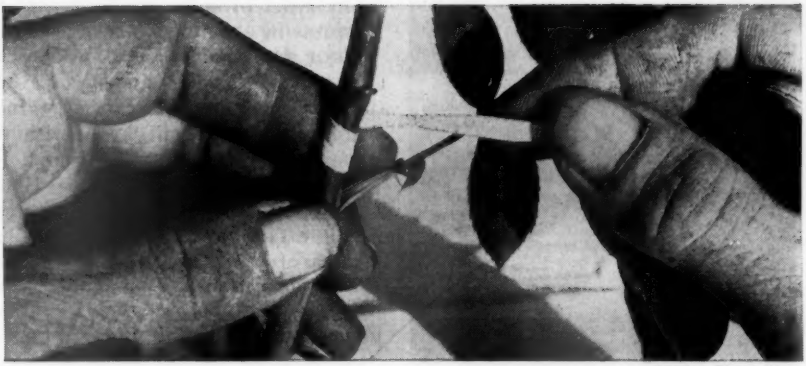


Photo: Three Lions

Leaf buds taken from stems of new rose seedlings, carefully budded into main stem of wild stock.

do your own rose budding

Some helpful pointers that bring any home gardener the fascinating experience of budding roses "in situ"

RALPH OLDHAM

Can I grow better roses than I am now growing? Will understocks affect the growth and blooming habits of the hybrid tea roses budded on them? Is there a better understock than Multiflora? What is the best understock for my soil and climate? Because one hybrid tea grows well budded on a certain stock, does it mean that all hybrid teas will grow equally well?

The rose-grower who is searching for the answer to these and other questions will add greatly to his enjoyment and knowledge of roses if he will learn to propagate and bud them, "in situ," on his own ground, and under his special soil and climatic conditions. This means that he shall plant the understock where the rose is to grow permanently and bud it after it is established.

budding roses

Most modern roses are grown on understocks, which are usually rooted cuttings of *Multiflora,* or some other hardy type, about one-fourth inch in diameter, that are lined out in nursery rows in the spring and budded in the late summer of the same year with mature buds of the variety which the nurseryman wishes to produce. The plants, with the dormant buds in place just above the ground level, remain in place in the nursery row during the winter. Early the following spring the top of the understock is cut off about one inch above the dormant bud. This stimulates the bud and causes it to grow very rapidly and form the entire top of the plant, which is grown until late autumn when it is dug and offered for sale as a two-year, budded, field-grown rose.

transplanting damages roots

If these plants are carelessly dug and roughly handled, many large roots are cut and broken, and as the large canes must be cut when transplanting, this leaves many large wounds. These wounds heal very

Photo: J. Horace McFarland Co.
Many rose varieties may make suitable budding understocks. Pictured is Paul's Scarlet climber.

slowly or not at all, and this may account for the loss of many fine-looking rose bushes during the first year or two after transplanting.

After growing roses for many years I discovered that, under our Midwest conditions of soil and climate, roses dug and replanted with all of their roots—no large roots cut off—seemed to live longer and grow better. I then went a step further and set small-rooted cuttings of various understocks in the beds and rows where they were to remain permanently, and budded them in place—"in situ"—and never afterward moved them or disturbed their root systems. These roses, handled in this way, have been more uniform in habit, of stronger growth, produced more flowers, and have been longer-lived than any I have had which were transplanted as large bushes, regardless of where or how grown. I have repeated this trial a number of times and the results have been the same.

understocks

Most of the nursery-grown rose bushes planted in America are budded on some type of *Multiflora* understock, perhaps because it is easy to handle, is hardy, and grows well in many types of soil. It also makes a fast-growing plant. *Ragged Robin (Glorie De Rosamones)* is also used for understocks by nurserymen in California and elsewhere. *Rosa Canina* is used, to some extent, by a few nurserymen in this country, although it is widely used in Europe where time is not so important and the grower can afford to wait for somewhat slower growth of the young *Canina* plants, which make strong growth after the first year and are reputed to make longer-lived plants.

kinds of understocks

Buds will grow better when set on understocks no more than one-half inch in diameter, as the bark is thinner, slips more freely, and the wounds are small and heal quickly. It may be difficult to buy small plants of some of the desired understocks, but mature plants of *Canina, Multiflora, Ragged Robin, Odorata,* etc., may be obtained from some of the large nurseries and small plants propagated by cuttings or layers.

Rosa Canina is the hedge-row rose of the English countryside. It grows slowly when small but it is nice to work with. It accepts buds freely and is very hardy. It also grows well in alkaline soil. If your soil is alkaline, try it.

Ragged Robin is a China or Bengal rose, somewhat thorny, a strong grower, never suckers, and many hybrid teas budded on it make big plants quickly. The canes of *Ragged Robin* will kill back to near the ground where the winter temperature goes to 10 degrees below zero, but hybrid teas budded on it seem to be as cold-resistant as those on *Multiflora,* which is hardy to the tips of the canes at 20 degrees below zero. Buds seem to grow better on *Ragged Robin* when set two or three inches above the ground. After the tops are cut off and the buds are growing well, a mulch can be applied up to the level of the bud.

Odorata is an ancient Chinese rose which grows rather slowly when small but makes strong growth the second year. It is not very thorny and accepts buds freely. However, it goes dormant in response to dry soil rather than low temperatures, so that it will sometimes winterkill where extreme cold follows a wet fall. It is more drought-resistant than some of the others.

Rosa Rugosa is sometimes used as an understock. The canes are covered with small spines, which make it somewhat disagreeable to work, but it is very hardy. It is easy to propagate and it starts growth very early in the spring. Roses budded on it have a tendency to flower freely quite early with fewer flowers coming in the fall.

The old climber, *Dorothy Perkins*, makes a good understock, as it is a strong grower, is hardy, and accepts buds very freely. There are doubtless many other roses which would make suitable understocks. If you have any growing in your garden, do not hesitate to try them, as most rosarians agree that there is still much to be learned about budded roses, and the most desirable stock has, perhaps, not yet been found.

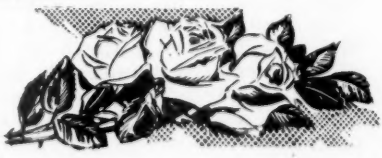
anyone can bud roses

Even though you have never budded any roses, do not hesitate to try it. All the equipment that is required is a budding knife, or a very sharp knife, and a supply of thin rubber strips, or tape, for tying the buds in place. These may be obtained at very small cost from any of the large horticultural supply houses.

Any good book on the propagation of plants will have one or more chapters on budding with illustrations showing each step in the several different methods of budding. Shield budding is the method generally used on rose stocks, and it has been my experience that buds grow better when the small chip of wood below the bud is removed before the bud is inserted under the bark of the stock.

Photo: J. Horace McFarland Co.
Hybrid tea roses are universally popular, bloom well as the Captain Christy shows.

If these directions are followed carefully, point by point, remembering that right conditions and timing are as important as the proper technique, I am sure that anyone who can grow good roses can learn to bud them successfully. The beginner must expect many failures, but at least some of the buds will grow and the best way to learn is by doing. Even experienced budders, working in nurseries under nearly ideal conditions, do not expect every bud they set to grow. If the buds fail to grow, the understock can be rebudded in another spot in a few days, so that by the end of the summer most of your stocks will have living, dormant buds on them. The rose-grower who has had the pleasant experience of growing and budding "in situ" some of his own roses will add greatly to his enjoyment of one of the most fascinating of all horticultural pursuits and will have a better answer to the question, "What is a good rose bush?"



The Organic World

RETURN OF WASTES TO SOIL TERMED ESSENTIAL

Pointing out that there are indications of a direct relationship between the return of organic matter to the soil and the formation of plant disease-preventing antibiotics in the ground, a recently published article in (of all places) a chemical journal emphasized the importance of returning organic wastes to the soil. One example of current research cited by the paper, the *U.S.I. Chemical News* of May, 1953, showed soil-borne parasites to have been suppressed by heavy manuring of infected soils with organic matter. With continued vigorous cultivation of the land organic matter has been vanishing from our soils in spite of great mechanical and technological achievements in agriculture. Half the tonnage of our food production above the ground is inedible to man and is usually wasted, while too many forget that organic matter exerts beneficial effects on the physical, chemical and biological properties of soil, and that inorganics alone are not enough to keep the soil at peak productivity.

IMPORTED PARASITES OFFER BIOLOGICAL CONTROL OF PURPLE SCALE

Purple scale, one of California's major orange tree pests, may soon yield to successful biological control methods according to a report in the June, 1953, *California Agriculture*. Encouraging progress in combatting the scale, *Lepidosaphes beckii*, has resulted in several of the state's principal citrus-growing counties through introduction of a parasitic wasp—*Aphytis* "X"—a recent importation from China. Purple scale damage, ranging as high as 84 per cent in test areas, was reduced to an estimated 1 per cent in some groves.

MAINE FACTORY MAKES FERTILIZER FROM CHICKEN FEATHERS

Maine's Waldo County has for several years been a growing poultry-raising capital. Processing plants for all aspects of marketing preparation have been set up and are thriving. Until recently, about the only wastes were the quantities of chicken feathers, which merely piled up until hauled off and buried. This is no longer the case since John J. Grady began operating his Brooks fertilizer plant, one of three in the nation turning out feather fertilizer. The process, as reported in the Bangor, Maine, *Daily News* of March 31, 1953, includes high pressure steaming, which softens and disintegrates the feathers; drying in a rotating drum heated by a 12-foot oil flame; and separating by hot gases, steam and screening. Chicken feathers are a good source of nitrogen and other plant nutrients.

WEED SPRAY FUMES POISON GARDENERS

The warning that weed-killers often bring toxic effects to more than plant-life is again borne out by current news items. A report from the May 28, 1953, *North Shores Sentinel* of Pacific Beach, California, reveals two instances of accidental arsenic poisoning resulting from the use and inhaling of weed spray fumes by gardeners. Both victims of the chemical preparations required hospitalization when medical investigation showed that the arsenic had rapidly caused a breaking down of their blood cells and subsequent internal bleeding. Biological control, the *natural method* of insect and pest control, incorporates no such patented poisons and their inherent dangers—yet these methods work—safely!

TIMES CHANGE: NORTHWESTERN RANCHERS GO TO COYOTES' DEFENSE

Imagine a cattleman going to the defense of the coyote—despised "varmint" of western history. Yet, according to an Associated Press news item of May 23, 1953, emanating from Yamp, Colorado, forty northwestern ranchers of that state actually want protection for coyotes, and have closed 40,000 acres of grazing lands to hunting or poisoning the animals. Their explanation? It's a matter of trying to regain a natural balance of wildlife in that area. The coyote population has been reduced so drastically that their natural prey—field mice and jack rabbits—have tremendously increased. Mice and rabbits hurt grasslands, the cattlemen contended—and coyotes don't eat grass.

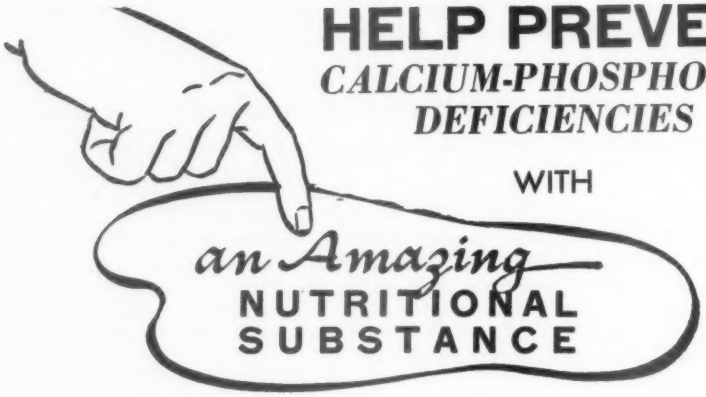
FIND 2,4-D INTERFERES WITH BAKING QUALITY OF WHEAT

Various experiments have indicated that the baking qualities of wheat are affected by applications of the chemical spray 2,4-D. According to the 1952 report of the Chief, USDA Bureau of Plant Industry, Soils and Agricultural Engineering, the use of 2,4-D also affects yield, protein content and germination of wheat. Reviewed in the June-July, 1953, issue of *Crops & Soils*, the Bureau's report showed that affected grain tended to have a high rate of respiration and protein content but low germination and baking qualities.

EXPERIMENT STATION PRESCRIPTION: EARTHWORMS AND HAY

After testing several of the new soil-conditioners that have received such an avalanche of attention and advertising over the past year or two, the Connecticut Experiment Station has come up with results which make it clear that until these conditioners are considerably improved, those who hope to solve soil problems with chemicals have a long way to go. Actually, however, states the release from the *Newark Sunday News* of March 8, 1953, we don't need a soil-conditioner—we have it in the earthworm. What is needed is something to serve as well as hard-to-get manure as feeder for these creatures to keep them populating and conditioning the soil properly. That something, the dispatch continues, is hay, preferably alfalfa or timothy. Even in dry form, hay contains the elements that help build healthy animals, plants and soils. Applying plenty, with the ground well firmed over it to insure soil moisture, will supply the earthworm populace with food—and as they consume, they bring soil enrichment and better aeration.

Want More Vitality and Energy? Watch Your Diet for MINERALS!



NU-AGE BONE MEAL

Rich Natural Source of Minerals . . . For Human Consumption From Selected "Beef Bone" of Healthy Young Cattle

Natural, organic minerals are a very essential part of good nutrition . . . especially Calcium and Phosphorus. NU-AGE Bone Meal is an excellent natural source of these minerals. Made from selected bones of healthy young cattle (U. S. Inspected). Truly an amazing nutritional substance. Helps combat calcium-phosphorus deficiencies . . . thereby helps promote vigor and vitality. Especially valuable for children in formative years. Try it! We believe you will be happily pleased!

The approximate analysis of Bone Meal (Phosphate) dependent on origin of the bone is as follows:

Calcium	33%
Phosphorus	15%
Ratio Ca to P	2.17
Magnesium	0.14%
Iron	710 parts per million
Fluorine	500 parts per million
Potassium	38 parts per million
Zinc	30 parts per million
Copper	5 parts per million
Manganese	4 parts per million

BONE MEAL (Flour) while new in the United States is definitely not new in Europe. It was prescribed there 60 years ago, and in the book, "Fifty Years A Country Doctor" . . . the good Doctor MacCartney writes: "Bone Flour as a source for Calcium will produce more consistent returns and better dividends on the whole than will calcium salts made in a chemical laboratory." He adds that bone flour contains all necessary salts in proper proportion for assimilation, is a natural food, harmless, and can safely be given in any amount. Bone Flour, as he puts it, "has been of great service in his own practice."

Try This Amazing New NUTRITIONAL SUBSTANCE

NU-AGE BONE MEAL

"For Healthy Teeth and Bones"

Try America's Fastest-Selling Brand of Bone Meal . . . In Your Choice of These Popular Formulas

Bone Meal Tablets — Plain

Each tablet contains 7½-grains of Purified Bone Meal without Vitamins.

100—75c; 500—$2.50; 1000—$4.00

Bone Meal with Vitamin D

(7½-grain Tablet)

Each tablet contains 100 USP Units Natural Vitamin D and flavored with Oil of Wintergreen. Easy to take. May be crushed or swallowed whole.

100—$1.00; 300—$2.00; 1000—$4.75

IMPROVED

Bone Meal Wafer-Tablets

Each wafer-tablet contains 1-gram or 15 grains Purified Bone Meal with 200 USP Units Natural Vitamin D, Carob and Mint for flavoring. This Chew Tablet is ideal for children and adults.

100—$1.25; 300—$3.00; 1000—$8.00

Bone Meal Capsules — Plain

Each capsule contains 7½-grains Purified Bone Meal.

100—$1.00; 300—$2.75; 1000—$7.00

Bone Meal Powder — Plain

(bulk)

May be added into Muffins, Breads, Soups, Cereal or any type of food of the diet.

16 oz. $1.30; 3 lbs. $3.50; 10 lbs. $10.00

Powder with Vitamin D

16 oz. $3.50; 3 lbs. $9.50

Bone Meal with Vitamins A and D

Vitamin D is needed to regulate Calcium and Phosphorus metabolism and their utilization by your body. Vitamin A is needed to keep up normal resistance to infection.

TABLETS . . . 7½ grains of Bone Meal plus 1000 Units Vitamin A and 200 Units Vitamin D All-Natural.

100—$1.25; 300—$2.75; 1000—$6.75

CAPSULES . . . Same amounts and potencies as listed above. Only with extra convenience of capsule form.

100—$1.50; 300—$3.50; 1000—$9.00

Bone Meal, Kelp with Vitamins A and D

An ideal tablet . . . 7-grains. Includes 200 Units Natural Vitamin D and 1000 Units Vitamin A.

100—$1.25; 300—$2.75; 1000—$6.75

Capsules . . . same amounts and potencies as listed above.

100—$1.50; 300—$3.50; 1000—$9.00

Bone Meal Capsules with Vitamin D

Each capsule contains 7½-grains Purified Bone Meal with 100 Units Vitamin D. Easy to take.

100—$1.25; 300—$3.00; 1000—$8.00

Order Direct Postpaid—Guaranteed to be of highest Quality and Purity. Attractive Discount Allowance to the Profession and Dealers upon request. Write for current price list.

NU-AGE BIORGANIC PRODUCTS

Dept. G-8

Southview Court, R.D.1, Venetia 2, Pa.

fluorescent lighting of African violets

A simple technique coupled with sound organic fertilizing brings remarkable results to these popular plants

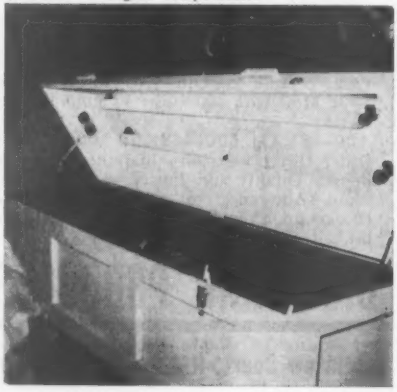
ROBERT L. RASMUSSEN, NEB.

Photo: J. Horace McFarland Co.

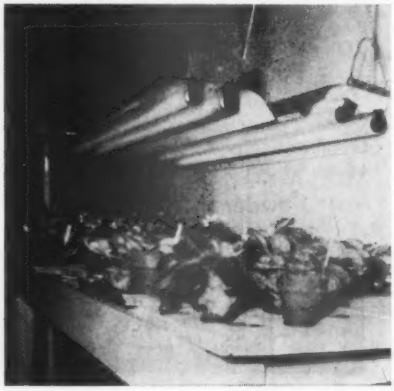
Since the German adventurer, Von St. Paul, discovered the violet growing on the low mountainsides in East Africa, it has grown in popularity until today it has become one of the most loved and grown of all house plants. A member of the Gasneriaceas family, the plant, with its thick, hairy green leaves and violet-like flowers, has become a competitive enterprise among growers who strive to produce the most perfect and most beautiful plants.

Everyday more and more people become interested in growing the plants. People like Mr. and Mrs. Floyd Hughes of Omaha, Nebraska, who raise the plants for their beauty and enjoyment. One of their latest innovations is an artificial light greenhouse. To have a large coffin-like box sitting in your basement might sound rather gruesome, but to Saintpaulias growers, it is becoming more and more popular. The secret of the box is found within its cover as it houses two large 40-watt fluorescent lamps. The box is 5 feet long and 2 feet wide. It is a foot deep with pegs along the sides to allow shelves to be adjusted to the level and intensity of light needed for propagation of the plants. The

"The Coffin Corner," a box arrangement in which the violet cuttings are carefully propagated at a constant 70 degree temperature.



Established plantings, having been started in a rich mixture of peat moss, compost, garden soil and bone meal, grow rapidly under four 40-watt tubes.



cover is always kept on the "coffin" with the lamps being lighted 24 hours a day. Within the box, the plants and cuttings are kept at a constant room temperature of 70 degrees. By keeping the box tightly closed, sufficient humidity is accumulated to keep the leaves and roots of the cuttings and plants moist all the time. The effect of the box, designed mainly for the propagating and the growing of small plants, has been highly successful. Begonia, gloxinia, and African violet cuttings planted in pure vermiculite, will show root growth in two to three weeks time and actual budding in five to six weeks.

Vermiculite has proven to be a highly successful soil element in the fluorescent system. A mixture of one-third each of peat moss, well-rotted compost or manure, and garden soil to which is added a sprinkling of bone meal is very good for a starter. The bone meal helps to keep the soil on the alkaline side and adds phosphorus which is helpful in increasing bloom. This, together with the vermiculite, gives a soil mixture best suited to African violets. A very small amount of charcoal may advantageously be added as it will keep the soil sweet. Sphagnum moss also has been used with successful results. The usual method of propagating African violets is by leaf cutting during the summer, but plants can also be started with the maximum of success almost any time of the year. Mature leaves are cut off to include an inch or more of the stalk. When the petiole dries, leaves can be placed in pure vermiculite, soil or even in a glass of warm water for a short period before planting them. When planting, care must be taken to set the crown just above the surface and to press the soil firmly around it. Because water on the surface may decay at the crown or on the base of the leaf stalks, soil drainage is very important. Mr. Hughes waters his plants from the surface, but cautions that rust marks will appear on leaves that become saturated or covered with water.

The coffin-like box in their basement receives no light from the outside whatsoever. The experiments with the lighting has produced some interesting results. One, the root growth is amazing. Within a period of two to three weeks, the roots are a solid mass at the base of the leaf cuttings. Two, there is a stepped up growth on the foliage of the plants. The leaves are more regular in shape,

The Hughes survey progress under the lights. Their basement experiment, which excludes all outside light, has produced many interesting results.

Matured growth of African violets provides a bright and colorful picture window against the mid-winter background of snow.

Yes! YOU CAN HAVE
HEALTHY VIGOROUS PLANTS
THE EASY WAY with
Ko-K-O
HERSHEY'S
Ko-K-O
WHAT IS Ko-K-O?
Cocoa bean shells and other parts of the cocoa bean are blended expertly and sweetened to produce a natural, organic material that will furnish a steady source of humus for the soil.

FOR LAWNS AND GARDENS

- **Apply Direct to the Soil**
- **Mix in the Compost Heap**
- **FEED TO EARTHWORMS**

An essential material for the Organic Gardener . . . A slow-acting, long-lasting energizer that increases and replenishes the organic content of the soil . . . Improves soil texture . . . absorbs and retains plant-nourishing moisture . . . helps decomposition of soil break-up into humus . . . binds sandy soils . . . loosens clay soils.

Packed in Handy 50 Lb. Bags. If your dealer cannot supply you we will ship direct to you. Freight prepaid east of Mississippi River. (Write for freight rates west of Mississippi River.)

NEW LOW PRICE

Send $2.15 for each 50 lb. bag; enough for 200 sq. ft. of NEW lawn or garden. Minimum Shipment 100 lbs. (2 bags).

HERSHEY ESTATES HERSHEY, PENNSYLVANIA

ORGANIC GARDENERS!

Activo makes rich, activated compost-fertilizer quicker, better, easier, cheaper, from waste leaves, garbage, etc. . . . **(reduces garbage without odor!)** . . . Activates, conditions and sweetens soils . . . Many other uses. **Organic.** Bacterial. Odorless. Trial size for 425-lb. compost, $1. 1350 lb. size, $2.59. 3 ton size, $6.99 pp'd.

Montgomery Ward & Co., Catalogs. Except West Coast

"SKIMGROW"

a skim milk formula . . . latest development in organic soil conditioners

Organic Products has tested various formulas . . . the result: Skim Milk with powdered Granite Dust and Soil Bacteria produces a better-blooming, healthier plant, with richer color and increased growth. That's the formula we offer you as sensational "SKIMGROW." 1 lb. covers approximately 100 square ft.

1 lb.—$1.75 ($2.00 W. of Miss.)
2 lbs.—$3.00 ($3.40 W. of Miss.)
6 lbs.—$6.00 ($6.75 W. of Miss.)

Put "SKIMGROW" on your garden. Order today from:

ORGANIC PRODUCTS

Dept. G-853, 2432 Route 22 Union, New Jersey

and the flowers show large panicle clusters. The light seems to produce larger leaf blades and small petioles resulting in heavily foliaged, but low, squatty plants. The leaves also produce interesting foliar patterns, spreading out on a horizontal plane of beautiful latticework. Three, the cluster of blossoms seem to be produced above the leaves which eliminates the difficulty sometimes occurring when the leaves cover up and hide the clusters.

Another mechanical feature which the Hughes have in their home is an open fluorescent rack which places 160 watts of light over a table of begonias and violets. The light operates on an automatic switch. It operates 16 hours a day and automatically shuts off for 8 hours before switching on again. The four-tube fixture has the same effect as a large greenhouse with the sun shining through the windows. As to the expense of the hobby, Mr. Hughes states that the lights reflect very little upon the household light bill and in two years of operation, only three of the lights have had to be replaced. As a climax to a lot of time, effort, and hard work, the Hughes have installed a large picture window with many varieties of violets lending beauty to the room. Here Sailor Girl, Sailor Boy, Ruffled Queen, Orchid Beauty, duPont, Pink Girl, and other varieties add their colors to the decorative scheme of the room. With this display of violet varieties, all propagated by the method of artificial light, there is little doubt in the minds of friends who visit the Hughes that this method will continue to gain interest among violet growers as more and more see the results.

maybe you wouldn't believe it . . . how much?

How much horsepower is there in a falling raindrop?

Scientists have been measuring the splash effect—the erosive power—of raindrops as they hit the earth. They've learned that an inch of rain falls on an acre of land with enough energy to plow that acre 10 times. Splash erosion dislodges tons of soil, often causing loss of soil, fertilizers, and bits of organic matter. It damages soil structure, too.

To prevent such damage, keep the soil under cover as much as possible—under meadow or pasture cover, under cover crops, crop residues, or on small areas—such as garden plots—under straw or leaf mulch.

A weird incident in Tennessee shows the freak powers of flying raindrops. After an intense rainstorm, animals in an overgrazed pasture were poisoned. Investigation revealed that they had been eating 700 pounds of soil with every ton of splattered forage (dry basis) and that the poison was an ingredient of fertilizer that had been used.

Said an engineer who studied such problems: "Implications are obvious for fields where vegetables are grown and poison sprays as well as rich fertilizers are freely applied."

To prevent splash erosion in fields, and to improve soil fertility and soil structure, the Delaware Extension Service recommends growing adapted varieties of cover crops. You may not get startling results in one year, they say, but cover crops plowed under have built up soil that produced 40 bushels of corn per acre to where it consistently produced 90 bushels or more.

Reprinted from *The Furrow*

TRULY RODENT-PROOF

COMPOST BIN

Galvanized for long life

- Circular construction, 4 ft. diam., 4 ft. high.
- Sets on corrugated, galvanized steel base. Provides perfect drainage, allows aeration, keeps rats out.
- Finished compost easily removed by lifting bin off compost pile.
- Makes practical composting of kitchen vegetable waste, grass clippings, leaves, etc.
- Shipped unassembled.
- Also makes ideal trash container. Holds season's accumulation of cans, bottles, etc.

$24.95 Delivered

Send check or money order.

KEELOR STEEL, INC.

919 Ninth St., S.E. Minneapolis 14, Minn.

How to Make Your Soil Get Up and GO!

The soils of Virginia and the Southeast are not the only ones that show remarkable response when ActivO is used to instill them with dynamic life and energy—and genuine condition. Just mix a few handfuls of **ActivO** with fertilizer, compost, mulch, seed, or direct in soil and see how much healthier your plants grow. ActivO sizes at $1, $2.50, $5.95 and $19.95.

WONDERLAND NURSERIES Ellerson 4, Va.

Hyper-Humus

CULTIVATED PEAT

Organic Soil Conditioner

Assures success of

LAWNS — VEGETABLES — FLOWERS

A "must" in planting and transplanting Plants, Shrubs and Trees. Improves compost. Use for House Plants and Windowbox Gardens.

Write for Special "TOPSOIL" Bulletin and "Better Roots" folder.

Ask your dealer for HYPER-HUMUS.

HYPER-HUMUS COMPANY

Box 19 Newton, New Jersey

Save Yourself Work and Time

With KEMP SOIL and COMPOST SHREDDERS

KEMP Soil-Compost Shredders save up to 90% in **time** and **labor** of manual mixing. The KEMP is fast and powerful; shreds all soils, peat moss, clay, vegetable matter and leaves (with attachment) to just the texture you desire. Stones and foreign matter are automatically ejected. Rugged all steel construction lasts a lifetime. Extra hard steel shredding teeth retain their sharpness. There's a **KEMP** size to fit your needs—and your pocketbook, starting at **$110.**

Gas or Electric driven or your own power take-off.

Write for details today

KEMP MANUFACTURING CO.
Dept. 4, 1027 East 20th St., ERIE, PA.

FLORIDA SOILS NEED ActivO!

Probably more than the soils of any other section, Florida's need the organic and dynamic **energy** that ActivO provides with its billions of natural organisms, biotics, minerals, hormones, enzymes, and genuine conditioners. $1 trial size (p'pd) treats 200-800 lbs. fertilizer, soil or mulch; 450 lbs. compost; or 2 to 32 bu. seed.
HUGHES SEED STORE. 116 S. Miami, Miami, Florida

Clean Chimneys Permanently

Stops down draft and Creosote, prevents furnace explosions—pulsations. Satisfaction guaranteed. This metal pot, (with character). Mailable. For free booklet (PAC) address

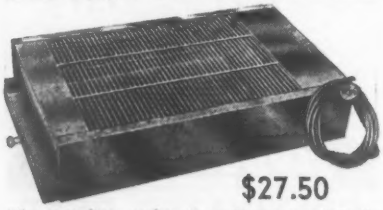
WIG., ABINGTON, MASS.

SAVES up to much FUEL

INSECTS KILLED BY THE BUSHEL

Without Dangerous Poison Sprays or Dusts!

No shock to people or animals. Write for free literature.



$27.50

Flies, mosquitoes, roaches, etc. can't stay away from the INSECT ELECTROCUTOR . . . modern, electrical way to eliminate insects thoroughly from homes, dairies, greenhouses, etc.

Insects attracted to simple bait go past top grid, are electrocuted by mild, low ampere shock. Night flying insects swarm to machine, lured by light bulb in receptacle.

INSECT ELECTROCUTOR is portable, easily attached wherever most needed. Operates on regular 110-120 volt A.C. current. Foolproof, all-metal construction, 24" x 14" x 5". Simply plug in.

Have comfortable, insect-free porch, rooms all summer . . . clear barns, sheds of disease-bearing insects. Just 30¢ a month to operate. Buy two . . . protect both home and barn completely. Mail check or money order to:

Insect Electrocutor Co. Station V, Box 88-G Cincinnati 10, Ohio

September

the north

- September is bulb planting time, especially bulbs belonging to the narcissus family—narcissus, jonquil and daffodil—and such bulbs and corms as crocus, snowdrop, chinodoxa and scilla.
- Depth of planting bulbs is about three times the height of the bulb.
- Chrysanthemums should be supplied with compost and compost water, and the buds pinched out for large heads.
- Dahlias should be staked if this has not already been done. Disbud regularly for fewer and larger flower heads.
- This is the best time of the year to make a new lawn and to improve established lawns. In the autumn, the seeds of weeds tend to become dormant and do not grow in competition with the lawn grasses. By spring the soil will be so completely occupied by lawn grasses that there will be no space for the weeds. Continue raking and cutting crab grass to prevent its seeding.
- Finely sieved compost and the finely pulverized phosphate and potash rocks are the best lawn fertilizers.
- Deciduous hedges (those which drop their leaves in autumn) should be pruned for the last time this month.
- Parts of the garden from which the crops have been harvested should be seeded with winter rye, vetch or

other hardy cover crop or mulched with shredded leaves, stems and other plant residues.

• Grapes should be picked before they get soft and allowed to complete the ripening process in a cool, dark place. Do not harvest them before they are sweet.

• Tomatoes that are removed when fully grown but still green will ripen if placed in a darkened, fairly warm place.

• Parsley and other herbs for growing in the house for winter use will grow better if potted this month and left in a coldframe or cool cellar until December.

• Apples are ready for picking when the green ground coloring disappears and the apple separates from the stem easily when the apple is raised up somewhat and twisted.

• Newly harvested onions should be stored for a few weeks under essentially outdoor conditions but must be protected from rain and direct sunlight.

• Remove all old canes from raspberry plants.

• Do not hurry to cut off the asparagus plants. So long as they are green they are manufacturing foods to be sent underground and stored there for early and vigorous growth of new stems next spring.

the northwest

Eleanor McConnell, Oregon

• Start your new winter compost heap. If you are a day-by-day composter, put on weeds, spent vegetable plants, grass clippings and leaves, as they are available. Kitchen wastes can be added every day, covering each addition with a small amount of soil and adding a small amount of "secret formula" when a full layer has been built up. (see "Impromptu Composting," *Organic Gardening*, March, 1952).

• Prepare some potting soil for the winter. Sifted compost mixed with

Are You Getting Enough Minerals in Your Daily Diet

Try BARTH'S
BONE MEAL

☛ **A Wonderful New Natural Source of**

- **CALCIUM**
- **PHOSPHORUS**
- **FLUORINE**
- **TRACE MINERALS**

(For Human Consumption)

Here is one of your most important natural sources of the Calcium, Phosphorus, trace elements necessary for strong bones and healthy teeth. BARTH'S Bone Meal is derived from the bones of selected, young cattle, and is completely natural . . . nothing added, nothing taken away. Start now to combat Calcium and Phosphorus deficiency with BARTH'S pure, edible mineral-rich sterilized Bone Meal!

7½ gr. TABLETS	POWDER
100—$1.00	1 lb. $1.50
500— 3.00	2 lb. 2.50
1000— 5.00	5 lb. 6.00

BONE MEAL TABLETS WITH VITAMINS A & D

In this special formula, 400 units of natural Vitamin A and 400 units of natural Vitamin D have been added to increase Calcium assimilation.

7½ gr. TABLETS
100—$1.00
500— 3.50
1000— 6.00

Postage Prepaid On All Orders

BARTH'S

Health Food Department

Department 125-G **Woodmere, New York**

SAVE MONEY

Lower Than Wholesale

If you are interested in natural, organically grown Health Food Products at lower than wholesale prices send for our price list.

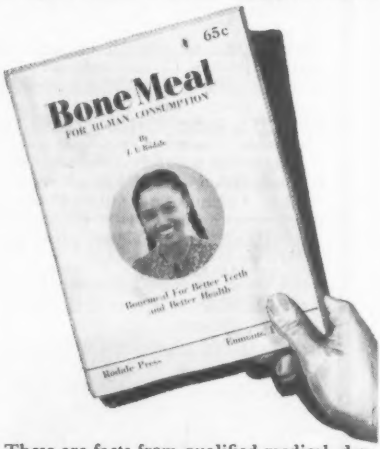
SOME SAMPLE VALUES

3 lbs. Bone Meal	$2.50
1000 Bone Meal Tablets Fortified with Vit. A & D	2.50
1000 Iodine Ration	2.25
1000 Vitamin A, 25,000 U.S.P. Units A	7.10
1000 Desiccated Liver Tablets	7.50
8 oz. Desiccated Liver Powder	1.90

NATURAL SALES CO.

745 N. Beatty St. Pittsburgh 6, Pa.

Introduced Bone Meal As Important Food Supplement



These are facts from qualified medical, dental and other authorities... compiled by J. I. Rodale, editor of *Prevention*.

Read a personal report on Bone Meal in the diet by Richard L. Matthewson, D.D.S., also *Report on Clinical Use of Bone Meal*, by Elizabeth M. Martin, M.D.

Many other enlightening chapters. Only 65c ...or send $3.00 for five copies... give the extras to your relatives and friends! Send your order today... to:

RODALE PRESS

Dept. 83-G **Emmaus, Pa.**

rich loam makes an excellent soil tc use during winter months when rains or freezing weather make it impossible to secure. Peat moss may be mixed in if your soil is heavy.

- First call for planting daffodil, hyacinth, crocus, snow-drop, scilla, fritillaria and other spring-flowering bulbs. Work bone meal into the soil around them.
- Time now to divide or transplant peonies. Planting too deep is a common cause of non-blooming, but starvation is another. They need very rich soil. Transplanting will often hold up blooms for one year. Put at least a bucketful of compost and a cup of bone meal in the bottom of each hole.
- Tie up chrysanthemums before the rains have a chance to beat them down. Light feeding with liquid organic plant food is beneficial while the buds are forming.
- Take in houseplants to accustom them to indoor temperatures before starting the furnace.
- Late cabbage, cauliflower, Brussels sprouts and broccoli plants may be set out this month. Purple cauliflower is worth trying. Heads are purple, need no bleaching, turn bright green when cooked, are delicious to eat.
- A few rows of "early radishes" will be ready for Thanksgiving.
- If the grape clusters are not ripening satisfactorily, cut away the leaves which are shading them. Get the clusters in the sun.
- Gather crops carefully, especially if they are to be stored:

  Leave hard-shelled squash in the garden a few days to harden the shell, which bruises easily if handled carelessly.

  Break over tops of onions, if not already done. Pull after tops are dead.

  Dig potatoes carefully, leave on ground until skins are dried off and hardened. Clean potatoes

and store in cool, dark place. Use all cut and bruised ones immediately.

Harvest shell beans when pods are dry and yellow. Shell and spread out until dry. May be dried in 200 degree oven for one hour, if desired.

• Gather the last few lonesome vegetables in the garden and can them together. They are wonderful for vegetable soup during those cold winter days.

• Renovation of old lawns is a September task which will pay good dividends next spring. Reseed bare spots, fill in small hollows with compost, top-dress entire lawn with a mixture of loamy soil, compost and leaf-mold. Care should be taken to avoid smothering the grass. Let the blade tips show through.

the south

Brent Senay, Georgia

• Renew mulch in the flower and vegetable garden as well as around trees and shrubs, particularly those set out in the last two years.

• Do not feed trees and shrubs at this time, as doing this will encourage them to put out new growth and keep their sap up so that they will be likely to be damaged or killed during the winter.

• Beets, Brussels sprouts, carrots, Swiss chard, cress, corn salad, kale, spinach, radishes, rape, turnips, leeks, mustard and several kinds of lettuce may be planted now. In Florida and the warmer regions of the South tomatoes and many frost tender vegetables may be planted.

• Start or renovate your lawn now. Mow established lawns of Bermuda, zoysia, St. Augustine or centipede and seed over the mowed areas with ryegrass immediately. Spread phosphate and potash rock and water well.

• Apply compost around each rosebush, dahlia and chrysanthemum plant. Keep them watered to encour-

you can GROW MORE—
you can GROW BIGGER
and HEALTHIER:
▸ GRAIN CROPS
▸ GRASSES
▸ LEGUMES
▸ VEGETABLES
if you treat your soil with this safe, non-acid, superfinely ground, natural phosphate. Benefits first crop and for years thereafter.

RUHM'S *Super Fine* PHOSPHATE ROCK

For Prices and Full information write:
AUSTIN FEED & SEED CO., Chattanooga, Tenn.
FRED P. BIERER, Box 28, Ames, Iowa
BRYAN & SHEFER, Portland, Indiana
PAUL V. DEAN, McBaine, Missouri
RALPH W. RIKER CO., Lansing 15, Michigan
JOHN A. SALZER CO., LaCrosse, Wis.
SINGER BROS. NURSERY, Milwaukee 12, Wis.
SOILSERVICE, Townsend, Massachusetts
VAUGHAN'S SEED STORE, Chicago 6, Illinois
FRED A. VEITH, Cheviot, Cincinnati, Ohio
CARL W. WESTLING, Hartville, Ohio

BUILD YOUR OWN Organic Shredder —SAVE OVER $100!

A sturdy, practical, power driven machine. Converts autumn leaves, garden wastes, compost piles, into ideal material for quick composting or mulching.
Easily built for about $20.00 (less motor).
Complete Plans & Instructions $2.00.
WATCH YOUR GARDEN GROW—NATURE'S WAY!
ORGANIC SHREDDER OG-835, Box 34, Valley Stream, N. Y.

GUANOBAT
(Bat Guano Plus Minerals)
Contains Ruhm Phosphate, Daly's Mineralizer, S.O.S. (Saves Our Soils), SPAR Seaweed, Dried Blood, Glauconite Marl, Tobac Powder. More essential nitrogenous, phosphatic, potassium and manurial substances for less money. 5 lbs. $2; 50 lbs. $6; 100 lbs. $10; express/freight collect. No C.O.D.
DALY PRODUCTS Townsend, Mass.

NOW YOU CAN HAVE
better compost without manure
BACTERIAL COMPOST ACTIVATOR
BCA
Turns Wastes Into Potent Compost
Amazing B.C.A.—turns organic wastes into rich living compost in only 3 to 5 weeks. You need no manures. B.C.A. supplies proper biological organisms . . . speeds up decay. Add to compost. 1 unit $1.00 ($1.20 W. of Miss.); 2 units $2.00 ($2.40 W. of Miss.); 6 units $4.50 ($5 W. of Miss.); 25 units $12.50 ($13.50 W. of Miss.) Prepaid. Each unit makes 1 ton finished compost. Order today from:
ORGANIC PRODUCTS 2432 Route 22 Union, New Jersey

Orlyt

GREENHOUSE $395

A delightful addition to your garden or home. Costs less than buildings of usual constructions. Made in sections for easy assembly with bolts and screws. $395 buys the 10 by 11 ft. Orlyt pictured ready to go on your foundation. Choice of slanted or straight sides and Lean-to greenhouses from $175 to $780. Automatic heat and ventilation available. Order now for flowers galore next winter. Write for Free Booklet No. AG-27.

LORD & BURNHAM
IRVINGTON N. Y. • DES PLAINES ILL.

YES, you can SPRAY ActivO on Your Soil!

ActivO puts billions of beneficial bacteria, plus accompanying bieties, hormones, enzymes, vitamins, minerals and conditioning agencies, into every cubic yard of topsoil. Just mix with water and sprinkle or spray on. $2.59 size dynamically energizes 3 acres; $5.95 size, 9 acres. Both prepaid.

ACTIVO—SOUTHWEST
201 North Lamar Dallas, Texas

If You Want to Stop Smoking

try NO-TO-BAC Lozenges. See how the aromatic flavor of NO-TO-BAC helps you give up the craving for tobacco. Rush $1 to NO-TO-BAC for 7 days' supply. (For heavy smokers—16 days' supply—$2.) Money refunded if not satisfied. Write: NO-TO-BAC, Dept. OG, Stamford, Conn.

5-HP Gravely Tractor powers 21 tools—does every lawn, garden, and field job *easier, better!* All-gear drive, Reverse. New "Power vs Drudgery" Booklet FREE. Write for it today!

GRAVELY
BOX 748 DUNBAR, W.VA.
FIELD-TESTED FOR 32 YEARS

age large Fall blooms. Check mulch.

• Withhold water from calla lillies. Divide and transplant as soon as dormant.

• Rearrange perennials in borders before adding Spring bulbs. Include Dutch Iris, Crown Imperials, crocus, Siberian Scillas, hyacinths and choice things you do not have, in addition to some of the new daffodils.

• Cut back scraggly annuals to encourage renewal of bloom.

• Root prune wisteria and bougainvillea that failed to bloom.

• Order trees, shrubs, vines and evergreens for Fall planting.

• Open Spring bulbs immediately on arrival and plant according to your plan made on paper. This will be useful next year if labels get lost during the winter.

• Popular Fall and early Winter-blooming annuals for Gulf Coast and Florida planting are Sweet alyssum, snapdragon, calendula, cornflower, cosmos, Gypsophila, annual Lupin, marigold, nasturtiums, pansies, petunias, and sweet peas.

• In the Upper South perennials are an important part of the flower garden. Plant now, Columbine, hardy asters, Canterburybells, hollyhocks, perennial Lupin, perennial poppies, and candytuft.

the southwest

Charlotte M. Hoak, California

• The first of September brings us to our "Second Spring." Aim to get all winter vegetables, both seeds and plants in by the middle of the month before the night temperatures drop.

• In well-watered and compost-enriched rows set out your stocky plants of cabbage, cauliflower, broccoli, kale, chard and kohlrabi. In double rows set onion sets and seedlings and lettuce. Sow seeds of carrots, beets, lettuce, winter radishes, Chinese cabbage. Soak carrot and beet seed. Use radishes as a nurse crop for carrots.

• Mulch all plantings. Use lawn clippings, if nothing else is available. They are less expensive than bean straw, chopped alfalfa and leaf mold.

• In favored localities, Canadian Bush and Ventura wax beans may be planted the first week of the month. Use Windsor, they give double service, food and soil renewal. Tall Chinese peas planted and trained up like sweet peas make one of the best winter crops.

• Plan for spring food crops and get together material for sheet composting. Collect "turkey poult," chicken manure, rabbit-pen droppings and sweepings from dairies. Spread out over a vacant area. Put on a thick top layer of dry waste. Give a thorough irrigation once or twice. The winter rains will do the rest. Spade under before the spring planting and you will get a bumper crop.

• Set in beds and borders your winter annuals so as to get the mid-winter bloom. Our standbys are calendulas, "tetrasnaps," Iceland poppies and stocks along with pansies, violas and primula malacoides.

• Plant Christmas-flowering sweet peas in a warm, sheltered, sunny position. Those set from pots and plant bands escape the birds. Protect from slugs and snails by a layer of grit or lime. They need plenty of water down underneath.

• Watch your chrysanthemums and dahlias. Do not fertilize after color shows in the buds. Use muslin and cheesecloth shades to keep the hot sun from fading the blooms.

• Prepare lawns for fall planting. Try if possible to get some of the new Bermuda, which is evergreen in winter, does not seed and is warranted not to spread by too many runners.

• By the end of the month have your orchards ready for winter cover cropping. Melilotus is still a dependable one. Encourage the growth of dwarf lupine and bur-clover. Purple vetch and barley are excellent.

Work Less—Grow More!
Merry Tiller
• Handy rotary tiller and tractor.
• Tills and mulches up to 10" deep in every kind of soil.
• Weeds up close to plants.
• Tines are fully guaranteed.
Patented
Also Pats. Pend.

Ask for Free Demonstration
See sturdy Merry Tiller work the soil—do other jobs. Due to gripper leverage plus light weight, it out performs heavier machines. 2 h. p. motor. Dealer inquiries are invited.
Get Free Folder!
Write:
MERRY TILLER, 814 Skinner Building
P. O. Box 1835, Seattle 11, Wash.

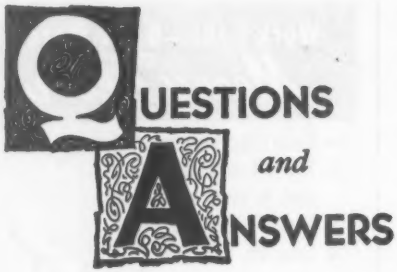
Makes All Plants THRIVE
...EVEN IN THE POOREST SOIL!
BIO-GRO
ORGANIC Liquid Fish PLANT FOOD

JUST ADD WATER

SPRINKLE OR SPRAY
Enjoy a greener lawn, lovelier flowers, bigger vegetables with BIO-GRO true liquid fertilizer. It's complete food for all plants, quickly absorbed through roots and leaves for sensational growing results.
10-5-5 Formula gives DOUBLE VALUE PLUS natural plant growth factors. Not a slurry or emulsion. No burn, odor or waste; keeps indefinitely. Ideal compost activator.
ECONOMICAL—EASY TO USE. Pint can makes 40 to 100 gals. nourishing solution—only $1; Qts. $1.65; Gal. $4.95, all postpaid. Free Garden Booklet. Order NOW!
BIO-GRO Div. A, Bioproducts, Warrenton, Ore.

ANY GROWING CONDITION IS YOURS
IN AN Ezyrected GREENHOUSE

TEXAS GREENHOUSE COMPANY
Ideal for back yard gardens. Ezyrected Greenhouses are economical, attractive, and easy to erect. Made of redwood and aluminum—no rust, no rot. Variety of types and sizes to fit your space. Shipped in fabricated sections, including glass, ready to assemble on your foundations.
FREE CATALOG ON REQUEST
1506 W. Rosedale Fort Worth, Texas



insect borers

Q. A sticky substance is oozing out of the fruit and trunks of my peach trees. The leaves on one of the young trees have in the last two weeks turned yellow and the fruit is dried up. Can you tell me the cause of this trouble, and the remedy, if there is one?

A. The gummy substance may be the result of the work of borers, or it may be a manifestation of brown rot, a fungus disease. If the former is the cause, we suggest you pass a pointed wire up each of the straight burrows, piercing the borer. Some borers make criss-cross tunnels immediately under the bark, and of course these cannot be impaled on a piece of wire as can the others. Since you say the leaves have turned yellow and the fruit has dried, it appears that brown rot may be the cause. If this is the case, it will be necessary to cut out all diseased twigs and branches and place all infected fruit or all mummies in the middle of a compost heap.

swamp plants

Q. Can such swamp plants as cattails, bur reeds, and sedges be used as green matter?

A. Yes, any and all plant materials can be used. The value of the compost increases usually as the number of kinds of plants used increases, because all the essential elements for plant growth are apt to be in such compost.

building soil bacteria

Q. May I ask how good bacteria may best be created in the soil?

A. As organic material collects in the soil, bacterial action increases provided that the bacteria get both energy food and growth food. Energy food is derived largely from carbon material such as plant residues, while growth food derives from nitrogen such as is supplied by animal manure, and horn meal, dried blood and the like. This is the same as in human nutrition.

fertilizer for potatoes

Q. How can you use compost for growing potatoes since you can't use either manure or lime on potatoes?

A. You have been misinformed when you state that manure should not be used for potatoes. Raw manure may not be used, but exceptionally well-rotted manure would be satisfactory. The potato is a crop that requires very little fertilizing and also a neutral to acid soil. It would be best to make a separate compost heap for this purpose, eliminating the lime. Peat humus would be good because it is acid.

fall-flowering crocus

Q. I am told that the fall-flowering crocus is highly poisonous. If so, what protection is necessary in order not to damage other plants?

A. Colchicum autumnale, often called the fall-flowering crocus, is a plant that has caused cattle poisoning in regions where it grows in the wild and where cattle have not learned to be on their guard. An extract of the bulb is used by plant breeders to produce injuries to the reproductive process of the plants. The carriers of heredity, the chromosomes, are doubled and normal cytoplasmic division does not occur. But there is no indication that colchicums affect other plants growing near them and you may safely plant these bulbs.

Be Conscious of the Oft-Ignored "Mineral Factor" in Your Diet!

FALKNER & MAY'S NATURAL MINERALS

(All These in One Capsule)

- Calcium
- Phosphorus
- Iron
- Copper
- Potassium
- Iodine
- Choline
- Fluorine
- Manganese
- Zinc
- Magnesium
- Sodeom
- Sulfur
- Silicon
- Trace Minerals

Plus Vitamin D

Prepared from

Bone Meal
Bone Marrow
Sea Kelp

Do you know that Minerals are the main raw material used by Nature to build (and maintain) these vital parts of your body: Bones, Teeth, Muscles, Nerves, Glands, Brains, Heart and Blood?

Are you also aware that there is a steady demand on the supply of Minerals in your body... and that each day your system excretes a varying amount?

Take just one of these Minerals for example ... *Calcium.* It is a known fact that the body requires the continuous presence of calcium in the blood. Without adequate Calcium the blood cannot clot readily when you cut yourself. Nerves and muscles nourished by the blood keep calling for Calcium. Your blood will seek to maintain the needed percentage of Calcium ... *even if it must drain other tissues of this essential Mineral.*

Why risk the possibility of "hidden" Calcium-Phosphorus deficiencies ... or a lack of other minerals essential to energy, vitality and bodily endurance?

Natural Minerals are important in your daily diet! Doubly so, if they are also organic and contain the trace elements so beneficial to good health. Remember: the system will absorb and utilize these *organic* minerals, but it will not absorb and utilize the *inorganic* minerals often found in medicines.

Falkner & May's Natural Minerals are such an organic product. Prepared from purified Bone Meal (approved for human consumption) which retains the value of Bone Marrow and deep sea Pacific Kelp. Plus natural Vitamin D. A 100% natural and organic diet supplement ... for adults and children alike.

100 Capsules	$ 3.00
200 Capsules	5.00
500 Capsules	10.00

☛ *Order Direct Postpaid*

● *Money Back Guarantee*

FALKNER & MAY, INC.

Department 8-G
1445 First Avenue, New York 21, New York

Green Nutro

Reg. U.S. Pat. Office

★

Use this scientific blend of natural soilbuilders on your lawn, flowers and garden plot this Fall. Supplies all the necessary plant nutrients in one package.

An application this Fall on your lawn or flower garden will assure you of maximum results in the Spring. Before sowing your cover crop on your garden, mix Green Nutro generously in the soil.

Write for free pamphlet.

★

EASTERN STATES SOILBUILDERS INC.

SHARPSBURG, MARYLAND

Telephone — Keedysville 4851

"The home of Green Line Products"

ActivO

activates compost, energizes and conditions soils, makes fertilizer more efficient. Just mix with waste material (compost) or with fertilizer, mulch, seed, etc., or dig-in or spray-on soil. Sizes $1 to $19.95. Prepaid $5.95 size treats 2 tons compost, 6500 lbs. fertilizer, mulch, etc., or 32-400 bushels seed.

BRECK'S ACTIVO DEPT.

401 Summer Boston, Mass.

COMPOST—

AS YOU LIKE IT

SCREENED
SHREDDED
GROUND
MIXED
PILED

Make perfect compost with this portable, gas or electric powered compost grinder that's designed for easy moving. Grinds, shreds, and screens tough organic matter, wet or dry, into compost material, mulch or fertilizer. Mixes and screens soil, compost and other fertilizers fine enough for seeding flats. Separates trash. Sold with or without motor. *Write for literature and dealer's name or order direct* $124.50, less motor, F. O. B. Wichita.

W-W GRINDER CORP.

DEPT. B WICHITA, KANSAS

a lawn problem

Q. What causes moss on lawns?

A. This does not necessarily indicate an acid soil and lime should not be applied. It shows that the soil is infertile and needs heavy applications of organic matter. It also indicates poor drainage. The soil should be reworked to a depth of two or three inches and compost applied. Bone meal and dried blood would be excellent. Moss grows especially in shaded areas.

orange rinds in compost

Q. We have some orange rinds every day. Are they of any value in the compost heap?

A. An ash analysis of orange rind showed a content of almost 3.0 per cent phosphoric acid, and 27.0 per cent potash. This is similar to the skins of other citrus fruits and to potato peelings. The latter may even be higher in phosphorus. But while potato skins are rather low in nitrogen, some citrus fruit, especially the spongy skins grown on fertile soils, have considerable amounts of nitrogen in them. We should, therefore, advocate the use of all such material in the compost heap.

"Just what I wanted—earthworms for my organic garden!"

the decision must be ours

In the April, 1953, issue of *Horticulture* magazine there appears an article by John C. Wister, noted horticulturist of Swarthmore, Pennsylvania, who presents a forthright and worthwhile discussion of the organic and chemical methods. The following excerpts are from Mr. Wister's thought-provoking summary:

"There can be no denying the fact that injury from insects and diseases has greatly increased during the turnover of age-old methods of fertilizing brought about by the advent of the gasoline motor and the resultant, almost total eclipse of available horse manure. It is also easily demonstrable that, in this period, many new pests have been brought in from abroad, so that not all or even most of the increase can have been caused by the type of fertilizer.

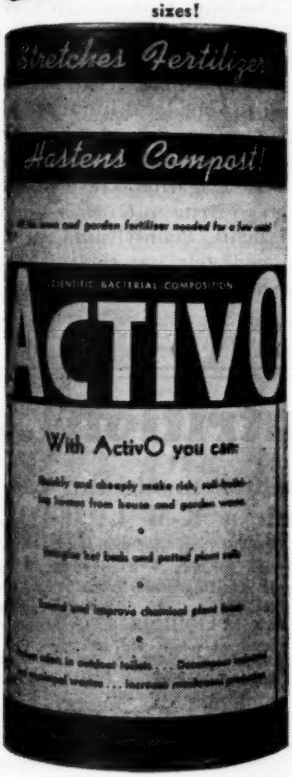
"On the other hand, the events have paralleled each other sufficiently to warrant a fair and intelligent trial of the organic methods rather than the shouting of charges and counter charges. Many fair-minded people believe that some of our agricultural college leaders resent any new development not discovered or brought into prominence by them which, in itself, is one of the dangers of bureaucracy. For this reason independent-thinking horticulturists should be on the alert to organize their own tests of the various phases of organic gardening, earthworm culture, plowless farming and all the other new "isms," and see how they succeed or fail under varying conditions of soil and climate.

"Today more than ever horticulture needs the help of all the experts it can get, but we who garden should reserve the right to our own judgment after we have not merely heard their testimony but have tried out various methods in our own gardens. We must do it ourselves."

NOW! Plans for building this handy indoor-outdoor Composter Cabinet are given

FREE

with the No. 7 size ActivO, as well as with the larger sizes!



Yes, packed with the No. 7 ActivO, which treats 1200 to 1700 lbs. compost, and sells for only $2.59, postpaid . . . as well as with the No. 20 (2 tons compost, $5.95, p'pd) and No. 100 (12 tons; $19.95) are the plans for building a cabinet in which you can make up to 5000 lbs. compost yearly . . . plus detailed directions for heap, sheet, row and cabinet composting; energizing and conditioning soils; stretching fertilizer; mulching; lawn care; plant propagating; etc.

BENSON-MACLEAN, Bridgeton 14, Indiana

RUSH, thru nearest dealer or direct. Enclosed $.....

☐ ..... size ActivO plus free plans and gardening literature.

Name .....

Address .....

Postoffice ..... State .....

Does Your Library Subscribe to Organic Gardening?

Many libraries all over the country do not subscribe to *Organic Gardening* magazine. This is a great handicap to scientific people and others who want to do research in the field of health and organic gardening and farming. You could do the organic method a great service by recommending to your local library—whether it is a college library or a public library—that they subscribe to *Organic Gardening* magazine. Just tell your librarian to write to *Organic Gardening,* Emmaus, Pennsylvania, and we will immediately put their name on our list and send them a bill for the cost.

"Well, human hair makes a good mulch and we're enthusiastic organic gardeners . . ."

Nutrition... plus

Summer meals the easy way with a K-M LIQUIDIZER

Cool, healthful fruit and vegetable drinks ● salads ● sandwich spreads ● baby foods ● special diets Dozens of exciting food treats that retain maximum nutrition values—prepared in seconds . . . thanks to K-M LIQUIDIZER'S 4 important features

1. **Two piece no-splash top** lets you add ingredients while blades are in motion . . . assures ease of pouring.
2. **Three Speed Switch** assures exact power for every type mixing, chopping, blending.
3. **Hexagon-shaped glass bowl** scientifically designed for whirlpool mixing action, visibility and ease of cleaning.
4. **Extra Powerful Swedish Steel Blades** for sustained sharpness, long life, heavy duty chopping and pulverizing.

JUST **$35.00*** WITH FREE **KITCHEN TOOL SET HANGER RACK** plus free recipe book

FREE... beautiful practical 8 piece "Crest" Kitchen Tool set and hanger rack. Regular $5.95 value FREE of extra charge with your purchase of a K-M LIQUIDIZER which alone sells for $40.00 in all stores . . . $46.00 value for only $35.00! ($37.00 West of Miss.) Order today for a summer of health treats . . . plus year round meal variety. *Prepaid

ORGANIC PRODUCTS CO. DEPT. 8-OG 2432 ROUTE 22 UNION, N.J.

compost . . .
the gardener's best friend

Here is the way you can have an endless supply always ready whenever needed: Provide a clean space at least 5 ft. by 5 ft. Start the heap with 6 inches of green matter (any green waste materials). Next, add a 2-inch layer of manure, then 1/8-inch of earth covered with a sprinkling of agricultural lime. Repeat these layers successively until a total height of 5 ft. is reached, including a 2-inch layer of earth over the completed heap.

Turn the heap thoroughly three weeks after its completion, then again five weeks after the first turn. Four weeks later, or three months after the heap was made, it is ready for use.

These directions are necessarily brief, and it is suggested that the gardener wishing a more complete guide write for J. I. Rodale's thorough booklet, *Compost and How to Make it;* 35c, *Organic Gardening*, Emmaus, Pa.

YOU HAVE TRIED THE REST
NOW TRY THE BEST.

YOUR SOIL NEEDS HUMUS

YOUR FARM WASTES WILL SUPPLY IT IF YOU

DECOMPOSE IN THE BIO-HUMUS "B" WAY

Satisfy your humus needs by treating all kinds of waste with our famous Biohumus "B" Bacterial Culture. It is the best your money can buy. It is SCIENTIFICALLY CULTURED, ISOLATED and SELECTED in our own laboratories to meet your requirements.

No quantity of waste is too small or too large to decompose, and it does not require any expensive machinery or set up.

For a few dollars you can turn tons of waste into the finest compost ever made. Let us solve your waste problem. Follow our plans and turn your wastes into dollars.

By Nature Years—Biohumus "B" Weeks.

Satisfaction guaranteed or money refunded.

BIO-HUMUS "B" LABORATORY, Box 25, Andalusia, Ala.

Combat
TOOTH DECAY

FROM WITHIN...

X-Ray study* shows that most men and women past 45—and many younger ones—suffer from a definite *demineralization* of bone structures which includes the teeth. A low dietary intake of calcium and vitamin D is generally known to be the cause of this condition.

**Ref: Report by Dr. F. J. Stare ("Nutrition Reviews")*

Prevent tooth decay in formative stages due to calcium deficiency. Build resistance with this marvelous protective food.

Insist on the Finest Schiff BONE MEAL

BONE-ALL

ALL BONEMEAL NOT THE SAME

Schiff BONE-ALL is a dependable source of the finest natural calcium. One 10 grain BONE-ALL tablet with each meal provides over 750 mg. or full M.D.R. of NATURAL calcium —balanced with Red Bone Marrow, phosphorus and important trace elements including safe amounts of fluorine, iron, copper, cobalt, manganese and others. BONE-ALL is made with sterilized U. S. inspected, pure, finely-ground *gritless* edible bonemeal. Each tablet is also fortified with natural Vitamin D for better assimilation. Schiff was first to introduce Natural Vitamin D and Red Bone Marrow in bonemeal.

BONE-ALL taken regularly is excellent for those who need calcium and especially for tooth and bone structure in children and for expectant or nursing mothers. Older folks with fragile bones who may be losing height due to calcium deficiency should find BONE-ALL particularly helpful.

In generous 10 gr. tablets

100—$1; 300—$2.50; 1,000—$6

Contains Bonemeal, Bone Marrow and Natural Vitamin D

***Powdered* Bonemeal and Bone Marrow**

1 lb. $1.50; 5 lbs. $6

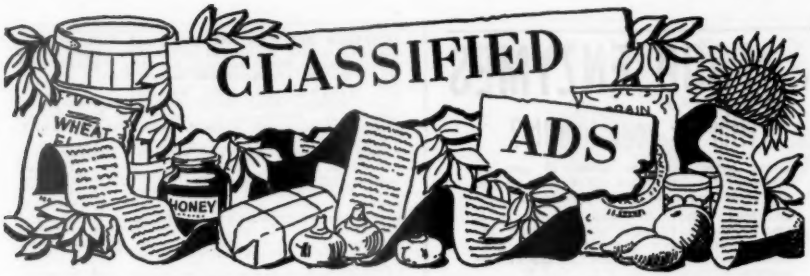
Schiff Bio **FOOD PRODUCTS**

AT ALL GOOD HEALTH FOOD STORES
Postpaid direct if unavailable
Dept. OG-8, Jersey City 3, N. J.

answers to review questions

(See page 37 Course in Organics)

1. True. In a pure crystalized state carbon is a diamond. In compounds it is present as a gas in carbon dioxide and other gases, and in coal, limestone, bicarbonate of soda, food, and many other combinations of chemical elements.
2. True. When organic matter decays, the carbon is dissipated more rapidly than the nitrogen, thus bringing down the carbon-nitrogen ratio.
3. False. By the time green matter is decomposed in the soil the C:N ratio has dropped to much lower figures than those represented by raw organic material. In a soil, the ratio declines as one goes downward, the topsoil ratio being slightly higher than the subsurface layer, which in turn is higher than that of the subsoil. The C:N ratio of soils in general, however, is much less than that of organic matter.
4. True. Soil bacteria and fungi need more protein for tissue building than carbohydrates which supply energy. Microorganisms, therefore, usually have a much lower C:N ratio than that of organic matter, humus, or soil, since a comparatively greater proportion of protein-containing nitrogen than energy-supplying carbon is necessary.
5. False. In the application of raw organic matter, the rate of nitrification depends on the C:N ratio of the material. If it is high, such as in sawdust (400:1), there will be no nitrogen movement, but if it is a material like young sweet clover (12:1), there will be a very satisfactory rate of nitrification. In humus, however, although the C:N ratio may be low, there is a resistance to rapid decomposition. The nitrogen movement is slower and will take place over a longer period of time.



Rates are 25¢ a word. Minimum 25 words, or $6.50. Payable in advance. Include name and address in word count. Copy deadline is 18th of second month preceding date of issue. Write Organic Gardening, 46 S. West St., Allentown, Penna. Send check or money order with copy.

FLOWERS

HEMEROCALLIS—Iris—Jan de Graaff Lilies. Gorgeous hybrids. Only vigorous, select, plump, blooming size live plants and bulbs shipped. Reasonable prices. Catalog 15¢. Deductible in plants first order. **ELMHERST GARDENS, Box 575, San Jacinto 1, Calif.**

REGAL LILIES—hardy bulbs. Flourish under varied conditions. White shaded pink trumpets—delicately fragrant. Shipped with healthy roots. 5 for $1.00. **McDONALDS BULB FARM, 8416 N.E. Going St., Portland, Oregon.**

AFRICAN VIOLET ROOTING POWDER. Wonderful new organic discovery. Faster, healthier leaf rootings. 1 oz. 50¢, 3 oz. $1.00, trial size 25¢ coin. **EVELYN JAMES, Davisburg 1, Michigan.**

AFRICAN VIOLET LEAVES—New and older, including Pink Wonder, Kansas City Girl, Snow Flake. Free list. Shipping until Frost. **MARY HINES, 5548 Antioch, Merriam, Kansas.**

FRUITS

FRUIT TREES! Stark Bro's sensational new "Dwarfs." Also standard size, exclusive patented, trade-marked varieties produce abundant, larger, better apples, peaches, pears. All fruit faster growing, quicker bearing. Also beautiful ornamental trees and shrubs. Get giant new Colorphoto Catalog FREE. **STARK BRO'S., Dept. 30084, Louisiana, Missouri.**

VEGETABLES

OLD FASHIONED POTATO ONION SETS, organically grown, plant now for earliest spring green onions which mature into large onions for eating and replanting. **DONALD KOUBA, Route 4, Mount Vernon, Ohio.**

NURSERY STOCK

BABY EVERGREENS—SEEDLINGS—TRANSPLANTS—SEEDS. Azalea-Rhododendron Hybrids. All Northern-grown Bulbs. Free Catalog. **GIRARD BROS. NURSERY, Geneva, Ohio.**

GARDENING EQUIPMENT

HOUSTON, TEXAS AREA: One-stop source of Organic Gardening supplies for pot, plot and farm. Domesticated Earthworms, pet supplies. Mail orders and inquiries invited. **THE GARDEN MART—L. H. Bowen, 5126 Old Richmond Road, Bellaire, Texas.**

NATURAL SOIL CONDITIONERS

NATURAL ROCK PHOSPHATE—Finely ground from high test Western phosphate rock. Ideal for organic farming and gardening. **PLANT FOOD CORPORATION, 3711 Medford Street, Los Angeles 63, Calif.**

ARROW BRAND rock phosphate—$2.00 per 80 lb. bag; KALORITE greensand $2.95 per 100 lb. bag. No C.O.D. orders. **OHIO ROCK PHOSPHATE SALES, R. 6, Springfield, Ohio.**

HOOVER'S COLLOIDAL PHOSPHATE and MARLAND GLAUCONITE MARL and **Hybro-Tite Potash Rock.** These three Natural Minerals have all the major and many trace elements. Build rather than stimulate soils. **HESPEN SOIL SERVICE, 1638 N. D. St., Fremont, Nebr.**

ILLINOIS! GO ORGANIC. Mineralize your soil with Colloidal Phosphate and Glauconite Marl-Potash. Order today. **LOEBER SOIL SERVICE, 1111 No. Clark Street, Chicago 10, Illinois. Phone: WHitehall 4-0500.**

BIO-GRO. Liquid fish fertilizer. Pint makes 40 gallons. $1.00 postpaid. Spray fertilizers the easy way with GRO-GUN. $2.95. **ORGANIC SUPPLIES, P. O. Box 820, Pittsfield, Mass.**

For natural beauty and lasting growth apply now! **PLANT-GRO ROCK PHOSPHATE** to protect your grass and plant roots from summer heat and dry spell. Retains moisture. Directions to apply enclosed in 40 lb. carton $1.50 2 for $2.50 Fob. plant, no C.O.D. **V. ROSSI, Box 34, Ontario, Ohio.**

COLLOIDAL PHOSPHATE AND GLAUCONITE MARL—the only two mined products that have the power of Base Exchange in your soil. For Michigan, Ohio and Indiana. Write for details. Dealers wanted. **JESS M. FANNING, 4951 South Custer Road, Monroe, Michigan.**

NATURAL ROCK PHOSPHATE—Finely ground from high test Western phosphate rock. Ideal for organic farming and gardening. **WESTERN DELTA CHEMICAL COMPANY, Box 217, Walnut Grove, California.** (Distributed in Southern California by Plant Food Corporation, 3711 Medford Street, Los Angeles 33, California.)

OHIO—Ruhm's Phosphate, Greensand Marland, Dolomite Limestone, Hershey Ko-K-O, Fertilife Compost, Actumus, Atlas Fish Emulsion, W-W Shredders, Soil Acidifier. **FRED VEITH, 3505 Mozart Ave., Cincinnati, Ohio.**

NEW YORK! Apply Hoover's Mix organically recommended to lawns, shrubs, flowers, gardens at any time. Will not burn the finest roots or foliage. **GEORGE E. FOSTER, Dept. 6-F, Gilman, Illinois.**

DAIRY-ORGANIC COMPOST—Processed Nature's way—not pulverized, not dehydrated, merely screened. Alive with bacteria, valuable trace minerals and hormones. Feeds instantly, no odor, will not burn—the best true organic cow manure compost produced. Only $8.00 per 100 lbs. (2—50 lb. bags) delivered anywhere in the United States. Smaller package, bulk, ton or carload prices on request. Free sample. **DAIRY-ORGANIC COMPOST, Menomonee Falls, Wisc.**

AA QUALITY GROUND ROCK PHOSPHATE $2.25 per 100 lb. bag and $25.00 per ton F.O.B. Selling and spreading Rock Phosphate and Dolomite Limestone. **MILLER'S SPREADING SERVICE, RFD No. 2, Box K-6, Princess Anne, Va.**

BAT GUANO! Richest of all manures as bats feed only on blood-sucking insects. Analysis: 12-9-4, 100% organic, $8.00 per 100 lbs. We pay freight! (Sorry no C.O.D. or less than 100 lb. orders). **GULF-PRAIRIE COMPANY, Box 4082, Corpus Christi, Texas.**

"BESTBUY" Hundred pound "Hi-Mag" Compost Limestone—Eighty pound each Ruhm Phosphate Rock and "GRAN" Potash Rock plus 5 lbs. "GUANOBAT" (Bat Guano Plus Minerals) or 5 lbs. Daly's Mineralizer ("All-In-One") with worthwhile gift. $5.00 frt. collect. **DALY PRODUCTS, Townsend, Mass.**

INSTANT COW MANURE. 3 pkts. make 3 gallons, 25¢; 100—2" Ferto-Pots. $2.75 prepaid. FERTO-GERM: Mineral fortified. Manure Compost. Contains millions of friendly bacteria. 50 lbs. $2.00; ton $60.00. Bacterial Digestors $550.00 up. Catalog FREE. **ALLEN COMPANY, Pittstown 6, N. J.**

"TOPS" Natural Potash Rock so fine plant root hairs, rootlets and pores breathe it in. Hundred pound bag $2.50. Ton $35.00, freight collect. **DALY PRODUCTS, Townsend, Mass.**

EARTHWORMS

EARTHWORMS—BROWN NOSED ANGLE, greatest soil builder of all, very prolific. Breeders $7.00—1,000; mill run $5.00—1,000 prepaid. **IVERSON'S WORM HATCHERY, 2743 53rd St., Des Moines, Iowa.**

ORGANIC FRONTIER BUILDERS: Hybrid Earthworms give soil new lease on life, mean more security for you. 650—$5.50, 1300—$8.00. Shipped prepaid with instructions all year. **LUTHER RITCHIE, Abingdon, Maryland.**

CALIFORNIA RED EARTHWORMS can enrich your soil. Why not let them convert all your waste into rich loam $4.00—1000. **REDDI WORM RANCH, 15014 Burbank Blvd., Van Nuys, Calif.**

GROW MILLIONS EARTHWORMS, our 19 years' Experience Guides You. Most informative circulars, low prices, prompt shipment. RIGHT instruction at START, Important. Write. **CALDWELL, Barwick, Ga.**

CALIFORNIA RED EARTHWORMS—We offer—BIN RUN BEST BUY—2 to 3 thousand per lb. Shipped in culture. Prepaid U.S.A. $6.75 per lb.—5 lb. lots and over $5.50 per lb. **CALIFORNIA EARTHWORM ENTERPRISE, 3007 N. Durfee Avenue, El Monte, Calif.**

CANADIANS—Buy your SOILUTION EARTHWORMS in Canada and save tariff, brokerage and longer-haul charges. Send for literature. No obligation. **GLOBAL EARTHWORM FARMS, Pickering, Ontario.**

RED WORMS—Soil Builders. Make rich black mineral filled soil from waste material. 200—$1.50, 1000—$3.50 postpaid. **JENKINS, 7621 Second Avenue South, Birmingham, Ala.**

Are **FOOD ENZYMES**

vital to your health?

These little "wonder workers" are an essential for life itself. Yet few people are even aware of their existence.

Enzymes digest all food . . . until it is small enough to pass through tiny intestinal pores into the blood. And perform many other "miracles" in the human system.

Our Free 24-page book "Enzymology" will open your eyes to the alarming enzyme deficiency in the modern American diet . . . a severe departure from Nature which involves millions of "well fed" people.

Write Today for This

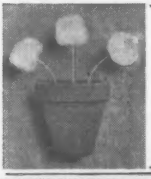
FREE BOOK

Here's a book you should read . . . now . . . if you believe the right foods are essential for vigorous health and vitality. It's yours FREE . . . without obligation. Mail postcard with your name, address to Dept. 8-G.

NATIONAL ENZYME CO.
5067 West Madison Street, Chicago 44, Illinois

ST. AUGUSTINE GRASS

Makes the world's most beautiful lawn, a padded heavy carpet, green year around. Thrives in dense shade as well as sun. It pushes all other grass and weeds out. Requires little mowing. You stick the twigs among other grass and weeds and its spreads fast. It will survive freezing weather. Now is time to plant. 1 Bu. plants about 400 Sq. ft., twigs 8" apart, $3 per bushel postpaid.
NATIONAL NURSERIES, Dept. 22, Biloxi, Miss.
P.S. Free colorful catalog on Camellias & Azaleas.



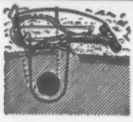
Keep Flies Out with

SHOO-FLI

Scare flies away from screen doors with dependable SHOO-FLI. Works all the time! Just $1.25 brings two attractive SHOO-FLI's postpaid. Send today!

KAY GARDENS
5065 Oberlin Ave. Lorain, Ohio

KILL MOLES
Save Earthworms



Earthworms are the favorite food of moles. Save them by trapping moles with Nash traps. Used by leading mole control specialists — in any type soil.

FREE

Send for free Mole Control Information. Nash traps are $2.85 at dealers — or direct, postpaid. Write NASH MOLE TRAPS, SCOTTS, MICH.

NASH Choker Loop TRAPS

EGYPTIAN RED EARTHWORMS "Red Wigglers." Excellent for fishing, a good soil builder from compost. Hand picked breeders $4.00 thousand, prepaid. **KESSINGER'S WORM FARM, 1210 South 8th, Arcadia, Calif.**

DR. OLIVER'S SOILUTION WORMS: Active, Hardy, Stock. Culture, Mixed Sizes. 1000—$3.50, 2000—$6.75, 4000—$12.95, 10,000—$27.50. Count and Live delivery guaranteed. Start now. Prepaid. **HARRY'S WORMERY, Donalsonville, Ga.**

RAISE BIGGER, BETTER FRUITS, VEGETABLES, FLOWERS, Etc.—by "harnessing" earthworms. First get unusual story, "An Earthworm Turned His Life"—Free. Write **EARTHMASTER SYSTEM, Dept. 24, El Monte, Calif.**

WORM WIZARDS WORKS WONDERS in building soil. 500—$4.00; 1000—$7.00; packed in castings containing quantities of spawn and eggs. Directions with every order. **BERKSHIRE EARTHWORM FARM, 568 South St., Pittsfield, Mass.**

NEW 64-PAGE EARTHWORM BOOK—"Raising Hybrid Earthworms for Profit"—all essential breeding information, plus valuable data on advertising and marketing—fully illustrated. $1.00 postpaid. ALSO: "Directory of Earthworm Hatcheries"—161 reliable sources in 34 states. Save time and money in buying breeders, bait, etc. Postpaid 50¢. **EARL B. SHIELDS, Box 467-C, Mountain Home, Arkansas.**

USE DOMESTICATED EARTHWORMS for best results in Gardening. Folder free. 500—$2.75, 1000—$4.50, 5000 and over, $4.00—1000. **EDMONDSON HATCHERY, 118 Mirabeau, Greenfield, Ohio.**

RED WIGGLERS—raise own Bait, Compost, Breeders, $5.00—1000. Mixed Culture approximately 1500—$3.50. Instructions—Worm Book $1.00, postpaid. **JULIUS BIRCH, R. 3, Muskegon, Michigan.**

BROWN NOSED EARTHWORMS—Excellent soil builders, 500—$5.00; 1000—$7.00. Prepaid. Write for free pamphlet or send $1.00 for 64 page "Raising Hybrid Earthworms for Profit." **LAND O'LAKES WORM HATCHERY, Redgranite, Wisconsin.**

EARTHWORMS, convert garbage into richest humus plant food. Profitable part or full-time business. Investment little as $3.50. Folders free. **STARR EARTHWORM FARMS, Orland, Calif.**

TILL-O-CAST EARTHWORM BREEDERS for organic gardening and fishing. 100 for $1.00 postpaid. Instruction sheet with each shipment. **MRS. HOWARD E. SMITH, R. 3, Jonesville, Michigan.**

COMMERCIAL PRODUCTION OF SOILUTION EARTHWORMS is our business. We will gladly share our experience with you. 300 worms, $3.00; EARTHWORM CASTINGS, organic fertilizer $1.00 Qt., Prepaid. Complete instructions accompany each shipment. Order directly, or write first for information and complete price list. **STOW EARTHWORM FARM, Rt. 3, Kent, Ohio.**

PREDATORY INSECTS

BIOLOGICAL CONTROL FOR INSECTS. Ladybugs are the economical means of pest control. 1/5 gal. $3.00. 1 gal. $10.00. We pay ½ shipping cost east of the Rockies. Guaranteed live delivery. Directions included; year round delivery. **O. B. and ETHEL LESTER, Rt. 1, Box 754-A, Sonora, Cal. Phone JE-2-9878.**

SOIL ANALYSIS

STOP GUESSWORK ABOUT YOUR GARDEN! Reliable laboratory analysis, complete recommendations for lime, plant food, organics, trace elements, $4.50. For full information and soil sampling directions, write **EDWIN HARRINGTON, Agricultural Chemist, Carversville, Penna.**

FOODS

FOODS THAT ARE FIT TO EAT has been our business for over 30 years. We specialize in Raw Nut Butters—imported crude Molasses—Unsulphured Fruits—Unheated Honeys—Raw Wheat Germ—High Potency Brewers Yeast—Powdered Goats Milk and many others. Write for price list. **RIEDEL FOOD PRODUCTS CO., 845 Amsterdam Ave., New York 25, New York.**

FOOD PREPARATION

GRIND YOUR OWN WHOLE WHEAT, GRAHAM, BUCKWHEAT OR RYE FLOUR, or soft, fluffy water ground corn meal with the genuine stone burr process (usually rarely available on local markets) at a cost little more than the price of the grain, on a MEADOWS HOUSEHOLD STONE BURR MILL. Will grind fine or coarse and requires only one horsepower motor plugged to any home outlet. Capacity 50 to 75 pounds per hour. No noise or dust objectionable for operation in kitchen. Full information direct from manufacturer. **MEADOWS MILL CO., North Wilkesboro, North Carolina.** For 50 years world's largest manufacturer of commercial stone burr mills.

DIET SUPPLEMENTS

FINEST QUALITY Natural Health Products. Vitamin E, 50 mg. Capsules, 100—$2.50. Rose Hips tablets, 100—$1.25. Bone Meal Tablets, 100—$1.00. Wheat Germ Oil Capsules, 500—$2.75. Vitamin A, 25,000 unit capsules, 100—$1.65. Liver Tablets, 100—$1.75. Brewer's Yeast Tablets, 1000—$1.75. Postage prepaid. Satisfaction guaranteed. Free price list. **BARTH'S, Dept. 125-OG, Woodmere, New York.**

BOOKS & PUBLICATIONS

ARTHRITIS AND RHEUMATISM sufferers; Read "Crude Black Molasses" the Natural Health Food by Cyril Scott. One Dollar postpaid. **HARMONY BOOK SHOP, New Castle, Penna.**

150 Answers to the Most Common Questions about Composting in

Questions & Answers on Compost

By ORGANIC GARDENING STAFF

Only 35c for this valuable and informative little booklet. Send your order today to Rodale Press, Box 81-G, Emmaus, Pa.

FREE BOOK—"505 Odd Successful Businesses." Work home! Expect Odd! **PACIFIC, 41C, Oceanside, California.**

LECTURES

BEAUTIFULLY ILLUSTRATED with professional color stills and movies. Many subjects. $25 includes everything; within 50 mile radius of Philadelphia only. **MARGUERITA PHILLIPS, 5343 Knox, Philadelphia, Pa.**

HEALTHFUL LIVING

For information about **MELBOURNE VILLAGE**, a planned community for productive homes and creative living, with emphasis on Organic Gardening. Write **AMERICAN HOMESTEADING FOUNDATION, R. 1, Box 328H, Melbourne, Fla.**

BUSINESS OPPORTUNITIES

Persons interested in furthering organic methods are invited to visit Evermay Ranch and the School of Country Living. Write **EVERMAY RANCH, Saratoga, Santa Clara Co., Cal.**

FREE BOOK "505 Odd, Successful Businesses." $250 Week reported! Work home. Expect something odd! **PACIFIC, Oceanside 40C, California.**

Run a Spare-Time Greeting Card and Gift Shop at home. Show friends samples of our new 1953 Christmas and All-Occasion Greeting Cards. Take their orders and earn up to 100% profit. No experience necessary. Costs nothing to try. Write today for samples on approval. **REGAL GREETINGS, Dept. 59, Ferndale, Mich.**

HANDWOVEN

IRISH TWEED: skirts, choice of three models, $29.50; men's sport jackets, $59.50; topcoats, $79.50; Tartan (machine woven) skirts distinctively pleated, $29.50. **CAROL BROWN, Putney 47, Vt.**

THOSE COTTONS from India, "Bihar" stripes: pleated or gathered skirts, 3 yds. around, $22.50; 4½ yds. around, $29.50. Stoles $3.95. Stunning. Samples. **CAROL BROWN, Putney 47, Vt.**

MAKE IT YOURSELF

SHAKE DOWN COMPOST containers from discarded metal items. Desired capacity. Discarded automobile makes handy tractor. Both printed instructions dollar. **TRACTORMAN, 3211-OG, Pleasant Plain, Elkhart, Ind.**

SERVICES

OUTDOOR TOILETS, CESSPOOLS, SEPTIC TANKS cleaned without expensive pumping methods. Simply empty miracle pellets for reducing masses, opening soil pores, deodorizing. Guaranteed safe and easy. Money refunded if not satisfied. Shipped parcel post anywhere U.S.A. **ELECTRIC DRAIN CLEANING CO., Boston 34, Mass.**

OUTDOOR TOILETS, CESSPOOLS, SEPTIC TANKS cleaned, deodorized with amazing powder. Safe, easy economical. Saves digging, pumping. Details FREE. **BURSON LABORATORIES, Dept. O-83, Chicago 22, Ill.**

Binders

for your valuable copies of ORGANIC GARDENING

All the news, features, editorials, to which you look forward every month can be preserved in these handy, durable, attractive leatherette binders. A file of *Organic Gardening* is a permanent encyclopedia of organiculture, health, inspiration.

Binders for 1953 Issues: $2.00

Binders for *Organic Gardening Library* Booklets: $2.00

West of Mississippi add 10c

Each binder holds 12 copies—easily inserted and removed. Stamped in gold on front and backbone. *Be sure to specify which binder you want!*

Please remit with order; we will pay postage

Organic Gardening, Box 82-G, Emmaus, Pa.

Do You Lack Pep, Energy?

NEW!
100% NATURAL AND ORGANIC

ELEVITES

A Truly Balanced Formula of 23 VITAMINS and MINERALS From These Protective Foods:

- *Desiccated Liver*
- *Brewers Yeast*
- *Fish Liver Oils*
- *Organic Iron*
- *Bone Meal*
- *Rose Hips*
- *Sea Kelp*
- *Bone Marrow*

ELEVITES contain Natural Food Vitamins and Minerals . . . the kind found in properly-grown garden-fresh vegetables and tree-ripened fruits, and in fresh, properly-prepared meats.

ELEVITES are more than a mere combination of natural protective foods. They are a balanced formula of natural vitamins and minerals . . . in much higher potencies than previously seemed possible in all-natural supplements. ELEVITES actually supply twenty-three vitamins and minerals . . . including Vitamin B-12 (the growth and blood-building factor) . . . in ONE easy-to-take tablet. Just try them!

Only one Elevite per meal provides the following percentages of the minimum daily requirements.

Natural Vitamin A	125%
Natural Vitamin D	150%
Natural Vitamin B1	100%
Natural Vitamin B2	100%
Natural Iodine	100%
Organic Iron	100%
Natural Vitamin C	100%
Natural Calcium	50%
Natural Phosphorus	23%

Plus other important nutritional factors

100 tabs. $3.75; 500—$16; 1000—$28

Postage Prepaid—Satisfaction Guaranteed

Discount to Profession and Health Food Stores

BARTH'S

Dept. 125-G

Woodmere, New York

TOWELS

12 Large Size Assorted Colors **ONLY $1.00**

Money Back Guarantee, Order Now!
MURRAY HILL HOUSE, Dept. 95-A
157 East 31st St., New York 16, N. Y.
Dealers' Inquiries Invited

MARTIN'S GRANITE DUST

Finely Pulverized

NOW is the ideal time to apply MARTIN'S Granite Dust. It breaks down during Winter. Next Spring, your soil gets benefits that last TEN YEARS! Perfect now as a Top and Side Dressing, it also KEEPS BUGS AWAY when used directly on plants. Harmless.
KEYSTONE GRANITE QUARRY
Box OG-8 Zionsville, Pa.

PLANT BIOTICS

in your soil this year

Just mix ActivO with your fertilizer, seed, mulch, compost, or direct in soil. It adds dynamic life and energy—not only biotics, but also beneficial organisms, hormones, vitamins, enzymes, minerals and natural conditioning agencies. $19.95 size treats 12 tons compost, 5 to 20 tons fertilizer, 25 to 50 acres soil (sprayed on). ActivO Dept., Rte. 1,
JOE FRANCIS SOIL SERVICE Terre Haute, Ind.

spread the word

Organic Gardening is striving to get its message to as many people as possible. We know that you as a loyal reader of this magazine would like to take an active part in our campaign for better gardening methods. You can help by passing out subscription booklets to friends, neighbors and acquaintances.

Each booklet tells the organic story ... the aims, principles, policies of organic gardening. Through a coded coupon we can trace each subscription back to you. We'll show our appreciation by giving you 70c for every subscription your coded coupons bring in. No work, no selling involved ... your natural enthusiasm will be enough to convince your friends, we're sure!

Write today. We'll be glad to send you 10 booklets as a starter ... more if you need them. Send request to:

ORGANIC GARDENING
Dept. Q **Emmaus, Penna.**

MISCELLANEOUS

BEAUTIFUL HAND DRESSED CHENILLE DOLLS, 7½" tall, red, pink, yellow, blue, lavender, green trimmed in white. $2.50 each. Money back if not satisfied. **ORLENE ANDERSON,** 8630 Phoenix Avenue, Fair Oaks, Calif.

CERTIFIED
ORGANICALLY-GROWN

All produce listed below is certified by notarized affidavit to be organically grown.

ORGANICALLY GROWN WHEAT processed into 100% whole wheat and cereal containing all the original vitamins and mineral salts of the wheat berry. Trial 5 lb. bag of flour or cereal sent postpaid for $1.15; west of Mississippi River $1.40. **LOUHELEN RANCH, Davison, Mich.**

BEST BAKED GOODS YOU'VE EVER TASTED. Made from 100% STONE GROUND ORGANICALLY GROWN WHOLE GRAINS, honey, fresh milk, raw sugar, butter, eggs, yeast, NO preservatives or bleaches. Breads, cookies, etc. Also huge selection of all natural foods. We ship regularly to customers throughout U.S. Guaranteed fresh delivery. Send 50¢ coin for delicious loaf bread and catalog postpaid. **STONE MILL PRODUCTS, Dept. BB-8, 1014 Franklin St., Grand Rapids, Michigan.**

STONE GROUND FLOURS AND CEREALS. All kinds of Health Foods. Shredding and slicing machines for vegetables. Liquefies, electric vegetable juicers. Ask for folder. Enclose stamp. **THE MILL, Box 699, Ledi, Calif.**

BLACK WALNUT MEATS. 3 pounds $3.75. Date Flakes. Wonderful for baking. (Free recipes). 3 pounds $2.10. Dried Olives. Unsalted. 2 pounds $1.95. Raw, thick, sprayfree sage honey. 3 pounds $1.75; 12 pounds $5.25. We pay postage. Free! New illustrated folder of 100 delicious, healthful foods, gifts. **TONTZ HONEY FARM, Elsinore 9, Calif.**

SHIPPING NOW! Why buy inferior vegetables when we can supply you premium produce at fair prices. Shipments to 3rd zone. **GERICKE'S ORGANIC FARM, Staten Island 9, N. Y.**

SUNFLOWER SEEDS—Hulled or Unhulled. Small supply from Rodale Organic Farm. Unhulled seeds 70¢ lb. postpaid (90¢ lb. W. of Miss.). Freshly hulled seeds $1.50 lb. postpaid ($1.70 W. of Miss.). Write for prices on large quantities. **RAYMOND GREENBAUM, R.D. 2, Allentown, Penna.**

BIO-DYNAMIC (organic grown) Whole Wheat FLOUR and CEREAL, BD RYE Flour and Cereal, BD Cornmeal, BD White Pastry Flour, stoneground organic oatmeal 5 lbs. $1.00 plus postage. Lower prices on 25 lbs. and over. Distributors in Chicago, Cincinnati, California. **WALTER BUSCHMAN, Juniper Farm, R.D. I, Chester, New York.**

DATES AND PECANS—Supply quick energy—Safe Foods—Organically grown by us in deep virgin soil of an ancient sea bed—rich in many vital protective minerals and vitamins—Free from poisonous sprays and artificial preservatives. 2 lbs. Desert Nuggets $1.00; 2 lbs. Organic Date Confection $2.00; 5 lbs. Family Special $2.50; 5 lbs. Choice Dates $3.25; 5 lbs. Pecans $4.50; 15 lbs. Chewy Natural Dates $6.75—delivered in U.S. Ask for Covalda Brand dates at your Health Food Store. **LEE ANDERSON'S COVALDA DATE COMPANY,** (Grower, Packer, Shipper), **Coachella, Calif. Hiway 99, P.O. Box 208-O.**

WHOLE WHEAT BREAD of Famous Hereford wheat, stoneground within 24 hours of baking. 2 loaves (including postage to 300 miles) $1.05, also flour 30¢ per lb. plus postage. **WEBER'S BAKERY, Runnemede, N. J.**

TOP FARM—Many natural foods for sale. Visitors welcome. 5½ miles north of Woodstock, Illinois on Route 47 to sign in tree, turn east (right) 1½ miles to farm. **Phone Hebron 2812.**

CLEVELAND, DETROIT, TOLEDO AREA READERS: Buy clean ORGANICALLY GROWN WHEAT directly from the farm at realistic prices. Grind your own cereal and flour for optimum benefits. **MOTTER'S ORGANIC ACRES, R.D. I, Genoa, Ohio. Phone: Lenoyne 67Y.**

OUR CUSTOMERS SAY. "Best we've ever eaten." Organicalley grown **SEEDLESS RAISINS. RED MALAGA TABLE GRAPES.** No poisons or artificials. Satisfaction guaranteed. Prompt shipment raisins. Grapes August and September. 3½ lbs. Raisins $1.85 postpaid. **GILBERT'S ORGANIC FARM, Sultana 21, Calif.**

"IT"

has more units of natural soil food for less money. "IT" contains more essential potassium, natural nitrogenous, phosphatic and manurial substances. It's "IT's" quality that gives "IT" it's Gro-Power. Try "IT." Buy "IT" and see how little of "IT" goes a long way. Trial pound $1.00 plus postage —five lbs. $2.00—fifty lbs. $6.00—100 lbs. $10.00 Express or Freight Collect.
DALY PRODUCTS, Townsend, Mass.

For Wonderful New Hair Beauty!

FALKNER & MAY'S

THREE - WAY

NATURAL HAIR TREATMENT

For Glowing, Lovely Hair Highlights

MASTER-FORM HAIR CREME...new and natural

Here's a scientific but entirely natural and organic preparation for care of the hair and scalp. Formulated from a base of pure Lanolin, Cholesterol, Carotene, Wheat Germ Oil and Methionene (many authorities say this element is essential in eliminating hair splitting and breaking). Not only does MASTER-FORM HAIR CREME tend for healthier hair, but it has proven ideal as a hair groom. It brings out all the natural highlights in your hair (gray hair becomes silvery gray—brunette becomes rich natural brown—black becomes blue black—red becomes golden red). Hair color is unchanged... natural highlights are accentuated. Three convenient sizes:

4 oz. (60-day supply) **$1.75**
8 oz. (120-day supply) **3.00**
16 oz. (Jumbo Family size) **5.00**

Try this new aid to beautiful, healthy hair... add shining new lustre tones!

GREEN FOAM SHAMPOO

A Natural Oil Shampoo for that Soft, Silky Natural Hair Beauty

For a wonderful new "feel" to your hair... for clean sparkling highlights and gorgeous natural charm... try new, different GREEN FOAM Shampoo.

Now... at last... here is a soft, gentle yet truly effective shampoo made entirely from natural oils. GREEN FOAM Shampoo is entirely free from harsh alkali soaps and irritating detergents (known now to cause dryness). GREEN FOAM Shampoo was developed by Falkner & May in response to demand for a natural hair cleanser.

This foaming green scalp and hair cleanser is highly concentrated. Apply only a few drops. Your hair billows out in a foaming lather. Dirt, dandruff and other hair accumulations are surrounded, picked up and ridden away on a wave of suds. Leaves your hair soft and lovely, your scalp pink and clean. Order GREEN FOAM Shampoo today for soft, clean, lovelier hair!

6 oz. bottle—$1.50 **2 bottles for $2.50**

VIBRA-TONE HAIR BRUSH

NEW and DIFFERENT!

Tingling Care of Scalp and Hair

Yes, it's an entirely new idea... stainless steel bristles (round tips) anchored in foam rubber. This combination gives a firm, yet amazingly gentle "vibrating" action as you stroke your hair. The brush almost feels "alive" in your hand.

Or press brush firmly until bristles meet scalp, move hand gently back and forth. Then watch how fast the "vibrating" action loosens itching dandruff, makes scalp feel alive and tingling.

Vibra-Tone Hair Brush has a one-piece back and handle... solid walnut. Bristles and mounting are stainless steel... gleaming, rust-proof. Easy to clean... made to last a lifetime. Order one for each member of family.

Only $1.00 or 3 Brushes for $2.75

☛ ***Order Direct Postpaid*** • ***Money-Back Guarantee***

FALKNER & MAY, Inc.

Dept. B-G, 1445 FIRST AVE.
NEW YORK 21, NEW YORK

Why the New ROTOTILLER*

Appeals to Women...as Well as Men

THE ALL NEW
Gasoline-Electric
Lightning Change
ROTOTILLER
Reg. U.S. Pat. Off.
*Reg. U.S. Pat. Off.

NEW Ease of Operation, With Finger-Tip Steering Makes ROTOTILLER Almost Do the Work by Itself—without Strain or Effort!

NOW *steering with only one hand*—you can "breeze through" the toughest lawn and garden chores with the New Gasoline-Electric ROTOTILLER. Its finger-tip steering makes it so easy to handle that women, young folks and even oldsters can use it for all kinds of jobs.

NO Strain, NO Effort Needed— Almost Self-Operating

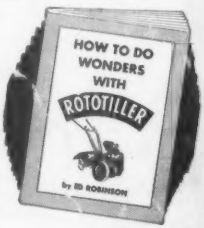
With the New ROTOTILLER you can prepare a seed bed in ONE simple operation. You can mow the lawn, weeds, tall grass, even brush with hardly more effort than it takes to drive your car. You can CULTIVATE... COMPOST, right in the garden itself... even SPRAY roses and vegetables... *have fun* doing any of a dozen back-breaking chores. NO pushing... NO pressure... NO bearing down. And what a "bang" you will get out of "polishing off" jobs in an hour that you'd have to pay an expert gardener $12 to $24 a day to do!

Performs Miracles in Minutes —THE WHOLE YEAR 'ROUND

A ROTOTILLER is actually a dozen different machines—ALL in ONE! In LESS than 60 seconds—through amazing low-cost Lightning-Change attachments—it can plow snow, do light bull-dozing, pump water, cut wood, haul heavy loads. You can use it for grading, fertilizer spreading, buckraking, even generate emergency electric power with it—ALL at an operating cost of LESS than $1 a day!

FREE BOOK Tells the Whole Wonderful Story

SEE how the new ROTOTILLER does the work of a dozen garden machines in ONE! SEE why mothers and daughters love the new ROTOTILLER too... how it handles "easy as a baby carriage." SEE how it actually does A WHOLE DAY'S CHORES IN A SINGLE HOUR... saves paying for hired hands... gives the family more free time... a whole new way of life! MAIL coupon now for FREE book, "How to Do Wonders With ROTOTILLER," by Ed Robinson, author of the famous "Have-More" Plan. Packed with pictures, scores of practical new ideas for getting more fun out of organic gardening. You can't afford to pass up the facts about this amazing LOW COST Wonder. Mail coupon TODAY to: ROTOTILLER, Inc., Dept. 108, Troy, New York.



ROTOTILLER, Inc., Dept. 108, Troy, New York

Please send me postpaid, by return mail a FREE copy of your 68-page book telling me all about the New Lightning-Change ROTOTILLER and its many wonderful Lightning-Change Attachments.

Name .....
(Please Print)

Address .....

City..... County..... State.....

G 12 55 IV 2 BV
LOS ANGELES PUBLIC LIBRARY
630 W. FIFTH ST
LOS ANGELES 17 CALIF